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ABSTRACT

A model for transforming data from verbal learning experiments into tables useful to an educational technician was developed, based on a similar one for scientific agriculture. The necessary data were obtained through two experiments replicated upon relevant populations. In the first study, a series of free-recall experiments were performed using the 1,000 most frequently used words as stimuli and 87 five-year-old children as subjects. These experiments provided a scaling of common words according to response availability which could be used in conjunction with measures of stimulus discriminability to select an optimum list of words to teach look-and-say learning. The second study was comprised of two experiments of a series to determine the optimum list for teaching phonic blendings. In the first experiment, 287 two-phoneme syllables were blended by 17 preschool children. In the second experiment, six groups of 20 preschool children received training with vowel-consonant and consonant-vowel blends presented in various orders. Tables, a rank ordering of words according to ease of recall, and references are included. (Author/DH)

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# COLLECTING A DATA BASE FOR A READING TECHNOLOGY

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January, 1971

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# COLLECTING A DATA BASE FOR A READING TECHNOLOGY

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January, 1971

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## ABSTRACT

The specific objective of the effort reported here is to collect a data base which will lay the foundation for a technology of elementary reading instruction.

More generally the objective is to provide a model for education similar to the one that has proved effective for scientific agriculture. In that field, agricultural experiment stations transform knowledge from chemistry by performing experiments that measure the effect of a particular chemical upon a particular crop in a particular soil. Similarly, in the field of reading, since there are no mathematical operations that transform data from verbal learning experiments into tables useful to an educational technician, the experiments themselves must be replicated upon relevant populations; e.g., by studying six-year-olds memorizing the sounds of letters.

Two such transforming studies are reported: the first scales common words for response availability; the second investigates factors relating to the subskill of phonic blending.

Scaling Learnability by Free-Recall. A series of free-recall experiments were performed using the 1000 most frequently used words as stimuli and 87 five-year-old children as subjects. These studies provided a scaling of common words according to response availability. Thus scaling will be used in conjunction with measures of stimulus discriminability to select an optimum list of words to teach look-and-say learning.

Phonic Blending. The first two experiments of a series which will determine the optimum list for teaching phonic blending were completed. In the first experiment 287 two-phoneme syllables, ordered from easy to difficult, were blended by 17 pre-school children. The concept induction rate for this order of presentation was determined.

In the second blending experiment six groups of 20 pre-school children were used. Of these, half received training with VC blends and half with CV blends. Of the three groups that were presented with each type of blend, one proceeded from easy to difficult blends, one from difficult to easy, and one received stimuli in random order. All Ss were then given a final test composed of new items. The results of this experiment have indicated several lines of attack for future blending studies.

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# I

# INTRODUCTION

The specific objectives of the research program reported here are twofold: (1) to collect a data base for a reading technology, and (2) to begin a study of verbal learning through an experimental analysis of reading behavior.

A more general purpose of the program is to provide a model for educational R & D similar to the one which has proved so effective for scientific agriculture. In that field agricultural experiment stations perform the experiments necessary to transform scientific knowledge into products and systematic tables useful to the agronomist. Similarly, an educational experiment station in reading would generate a systematic set of tables that could be used by the reading engineer to develop instructional materials.

## The Educational Experiment Station

In a recent paper Coleman (in press) noted that the current state of affairs in education bears a strong resemblance to that of agriculture in the early 1800's. For a century or so, advances in chemistry and biology had exerted little effect on field-crop production. The steady growth in farm production did not begin until agricultural experiment stations, instigated by Boussingault in the 1830's, began measuring the effects of particular chemicals on particular crops in particular soils.

Although other enterprises, such as engineering and medicine have, like agriculture, succeeded in applying the findings of basic science, education has been less efficient in adapting scientific knowledge to its special requirements. The relation between education and its underlying sciences requires that the scientific knowledge be transformed before any appreciable amount of educational engineering will be possible.

An engineer manipulates numbers or measures in order to predict what will happen when analogous manipulations are performed upon things. Knowledge from the physical sciences can be transformed by means of straightforward mathematical operations into the tables of precise measures required by the engineer. The sciences most relevant to reading instruction are linguistics and

the psychology of verbal learning, and psychology, at least, is organized in terms of hypothetical constructs and intervening variables. For example, most of the systematic data concerning the transfer effects of language habits has been organized under such hypothetical constructs as meaningfulness (m), unit-sequence effects, functional fixedness, etc. Such data is of little use to the reading engineer who needs to know, for instance, the transfer effects of a specific English spelling rule when, for instance, a six-year-old sounds out a given irregular word. To be of use to the reading engineer, knowledge couched in the form of hypothetical constructs must be transformed into tables of precise measures that can be manipulated to predict the behavior of a child in a learning situation.

Unfortunately, the experiments that generated knowledge of interest to reading were usually performed with college sophomores as subjects and with nonsense syllables as stimuli. There are no straightforward mathematical operations for transforming such data, and thus, no tables which scale the words, graphemes, phonemes, spelling rules, phonic rules, and other language units which comprise elementary reading programs. At present, the publishers and writers who design reading programs can make only crude assumptions about the characteristics of their materials.

An educational experiment station in reading, analogous to the ones which prove so successful for scientific agriculture, could serve as an answer to the dilema facing designers of reading programs. The goal of such an experiment station would be to provide tables that calibrate the language units that compose reading programs by replicating experiments on populations of direct interest to reading--on six-year-olds memorizing letter-sound associations, on children learning to read common words from flashcards, on children learning to print. The experiment station would, in effect, provide a data base that would be useful for educational engineering. Once such a data base of systematic measures becomes available, engineering breakthroughs can be expected for the simple reason that manipulating numbers is more efficient than manipulating things.

## The Data Base

Two recent papers, Coleman (1970) and Coleman (in press), detailed the research strategy to be followed in collecting the data base for a reading technology. This strategy is summarized in the following sections.

S-R Analysis of Reading Behavior. The first step in this strategy calls for the analysis of the complex hierarchy of skills that constitute reading behavior into subskills each of which is simple enough to yield to experimental measurement.

Table 1 gives a partial listing of the subskills a child must master in learning to read. The subskills have been conceptualized as a matrix of S-R functions. The S-term represents stimulus variables--language characteristics that affect reading behavior. The R-term represents psychological techniques for measuring reading skills--trials to memorize letter-sound associations, reaction time for reading particular words, phonic blending, etc.

Table 1 gives one of many possible analyses of reading behavior. It will not be defended as a true or adequate analysis. It merely serves as a beginning; it has already suggested hundreds of scaling studies.

The Broadband Experiments. Step two of the research strategy consists of a series of broadband experiments each of which rank-orders a set of language units according to a gross subskill of Table 1.

Coleman (1970) reported the findings of four such broadband studies. Using kindergarteners as subjects these studies scaled common words for learnability, graphemes for ease of learning their sounds, the English sounds for phonic blendability, and the letters for ease of printing.

There were two major reasons for starting with broadband experiments. First, these experiments provided data of immediate use to designers of elementary reading programs. They identified the language units most easily learned by children, i.e., the ones which should be introduced early when the child is struggling to understand the concepts of reading. Second, the broadband experiments sketched the data base in broad outline and suggested the strategic sequence for the studies to follow.

The Narrowband Experiments. Each of the subskills listed in Table 1 can be analyzed into much finer detail by taking into account the variables which affect the learnability of that subskill. For example, Subskill 1, the look-and-say learning of whole words, can be conceptualized as ordinary paired associate learning. Underwood and Schulz (1960) have shown that PA learning can in turn be analyzed into three stages: (1) discriminating the stimuli from one another, (2) making the response available in the learner's repertoire, and (3) pairing the stimuli and responses appropriately. Table 2 lists

Table 1. Partial List of Subskills Required in Beginning Reading and Spelling.

| Stimulus | Response |
|---|---|
| **Memorizing Basic Data** | |
| 1. Child perceives printed word as a whole. | He says word; he recognizes whole word-shape. |
| 2. Child sees letter. | He says phoneme. |
| 3. Child hears phoneme. | He gives letter. |
| 4. Child hears phoneme. | He prints letter |
| **Sounding Out a Word** | |
| 5. Child sees printed word. | He segments into sequence of letters, and/or syllables, and/or morphemes. |
| 6. Sequence of letters, and/or syllables, and/or morphemes. | He maps into (says) sequence of phonemes, syllables, morphemes. |
| 7. Child hears sequence of isolated sounds (that he says himself). | He blends into word-sound. |
| **Spelling a Word** | |
| 8. Child hears word. | He segments into sequence of phonemes. |
| 9. Sequence of phonemes. (that he says himself). | Maps into sequence of letters. |

Table 2. Three-stage Analysis of Whole Word, Look-and-say Learning.

| | Stimulus Discrimination | Response Availability | Stimulus-Response Pairing |
|---|---|---|---|
| Variables to be investigated at each stage of learning | 1. Word length<br>2. Word shape<br>3. Stimulus familarity<br>4. Interstimulus similarity | 1. Frequency of occurrence<br>2. Word class<br>3. Ease of recall | 1. Word association value<br>2. Presence of mediators |

some of the variables which affect each stage of whole word learning.

Such detailed analyses suggest narrowband studies that can isolate the variables that determine why language units rank-order as they do. The third step of the research strategy outlined here is to perform a matrix of narrowband experiments each of which plots a reading response as a function of a stimulus dimension. Chapter II of this report describes one such study which rank-orders words according to response availability.

The Optimum Lists. Once the rank-orderings generated by the narrowband experiments have been organized into a systematic data base, the education engineer's next task is to develop an optimum list for each subskill. An optimum list refers to the particular list of language units from which the child can most efficiently master the subskill.

A child masters a subskill by learning a sequence of subordinate items; the more items learned the more completely the subskill has been mastered. When items are selected and sequenced properly the child can master a subskill with minimum effort. There is some optimum-list of items which will give the greatest mastery in a given time.

In developing the optimum list for a particular reading subskill, the reading engineer must work in terms of a higher-order definition of "ease of learning". In the narrowband experiments individual language units were scaled according to ease of learning. In developing the optimum list numerous units are selected and arranged in such a way as to make the subskill itself easier to learn. In short, ease of learning no longer applies to individual units, but to overall sets of units.

The first step in establishing the optimum list for teaching a particular subskill is to select a tentative list of language units by considering each item's productivity and ease of learning. For example, in selecting words for the subskill of reading sentences, function words such as the, of, but, and the like must be included because of their productivity; they occur in large numbers of sentences. On the other hand, content words -- nouns, verbs, and adjectives -- can be selected almost entirely according to their ease of learning. Measures of learnability will be provided by the

rank-orderings generated in the broad- and narrowband experiments. Estimates of productivity can be obtained from frequency counts such as those of Thorndike (1944) and Rinsland (1945).

After the tentative list has been selected, the next step is to arrange the items in order of their introduction. Although the optimum list will, in general, begin with the most usable and learnable items, the list will not necessarily be sequenced from easy to difficult. Items will be sequenced so that the child masters the overall subskill with minimum effort. The optimum sequence might be one that intersperses difficult items with easier ones, or even one that proceeds from difficult to easy. Determination of the optimum sequence for a given subskill requires a progression of experiments which plot concept induction rate as a function of varying orders. Chapter II of this report describes two initial studies of a series which will determine the optimum list to teach phonic blending.

After optimum lists are established for individual subskills, they will be combined to establish the overall optimum list -- the list from which a child can most efficiently induce the overall concepts of printed language. The overall list is the framework for the year's program -- the complete list of items that will be taught arranged in their order of introduction.

## Applications to a Psychology of Verbal Learning

It should be noted that there is no reason why data collected for purposes of educational engineering should not be pertinent to the goals of the behavioral scientist. Once the data base is outlined in broad strokes, future experiments will not be replications, but will be collecting new data, and data collected on children learning words is just as pertinent to basic knowledge as data collected on college sophomores.

The goals for a psychology of verbal learning are describing, predicting, manipulating, and explaining that behavior. At present, almost all the effort is exerted on hypothesis-testing studies devoted to explaining verbal learning. The experimental analysis of behavior has contributed enough to animal learning to justify allocating resources to describing an area of verbal learning, and primary reading is as well prepared for fine-grained description as is the memorizing behavior of college sophomores. Primary reading skills can be analyzed into easily-measured subskills, the stimulus dimensions that effect the subskills can be precisely described, and the language populations are small enough to be exhausted.

Primary reading is a better task than adult memorization for studying extended processes. For example, the mastery of phonics can be analyzed into an easily measured set of subskills --part learning and part conception induction. Then, using tight controls and heavy schedules of reinforcement such as those of Statt's, et al. (1954), the learning of this extended process can be plotted. Except for three or four of the early German researchers, adults have refused to learn equally extensive sets of artificial materials.

# II

# SCALING WORDS FOR RESPONSE AVAILABILITY

One of the subskills a child must master in learning to read is the look-and-say learning of whole words. Look-and-say learning can be conceptualized as ordinary-paired-associate learning with the printed word being the stimulus and the child's saying the word the response. As discussed in Chapter I look-and-say learning can be analyzed in finer detail by taking into account the three stages of PA learning proposed by Underwood and Schulz, i.e., stimulus discrimination, response availability, and S-R pairing. Table I lists some of the variables which affect each stage in the paired-associated learning of whole words.

The narrowband studies reported here were concerned with stage 2 of this analysis, i.e., response availability.

## Rationale

Educators often accept frequency of occurrence as an estimate of response availability. An experiment reported by Coleman (1970) shows, however, that frequency is a poor estimate, at least for the first few hundred words a child learns. In that experiment a paired-associate technique was used to teach children to read words, the printed word being the stimulus and pronouncing it being the response. By this method 150 kindergarteners were taught, individually, to read 16 words each. The 16 words learned by each child were selected from a list of the 160 most frequently occurring words according to the Thorndike and Rinsland counts. (The list of 160 words also included 16 common first names and a few missing mates for bipolar adjectives.) Each of the 160 words was scaled for learnability according to the mean number presentations necessary for achieving a correct response. Coleman found that the effect exerted by word class far outweighed any effect due to frequency. Nouns and names are the easiest words to learn, even though they occur less frequently than many other words on the list.

The most direct approach to the measurement of response availability is through the use of free recall. Items are presented and the S is requested to recall as many as possible with no order constraints upon him. If certain items are found to be recalled with a high frequency by most children, then it can be assumed that these same items will be readily available as responses in learning S-R associations.

In order to compile a rank ordering of words according to response availability, an experiment on the recall of the most frequent 1,000 words was carried out with 50 five-year-old children in El Paso, Texas. Each S was tested for 10 days and on each day received 13 or 14 lists of 16 items each. Only the recall from the middle eight words in each list was tabulated in order to reduce contamination from primary and recency effects. Furthermore, to eliminate any biases due to a favored serial position or fortuitous interword associations with any one list, word lists were generated by computer with a different word order for each S. Two replications of this experiment were performed; one in Charleston, West Virginia, and one in Clemson, South Carolina. Since there were slight procedural variations in the replications, they will be described as separate experiments.

## Procedures

### Experiment I.

Subjects: In the initial experiment a total of 50 S's were run of which 28 were male and 22 were female. The S's ranged in age from 55 months to 75 months with the mean age being 68 months. The S's were chosen from nine different nursery schools and kindergartens in the El Paso Area. Nine S's were eliminated from participation in the experiment for failure to perform satisfactorily on the practice lists.

Stimuli: The pool of 1000 words was selected from two sources: 50 of the words were common first names; the remaining words were chosen from the Rinsland (1945) scale of words used by children in the first grade. The 950 words used most frequently by this age level were selected with the following exceptions: (a) if there were homophonic variations only one was included; and (b) when alternations of a word appeared (e.g., the singular and plural forms of a noun or the tense and number of a verb) and these alternations did not change the inflection of the base form, only the most frequent form was included in the list. Of the 50 first names, 26 were male and 24 female.

Each S was tested on all words and on each of the 10 days received either 13 or 14 lists of 16 items each. The lists were composed of four recency buffer items, four primacy buffer items, and eight middle test items. The primacy and recency items on trial became the eight test items on trial n+1. Thus each item

was presented twice, once as a buffer item and once as a test item. Because of the list structure, it was necessary to insert additional filler items in the first and last lists of the day. These 160 filler items (i.e., 16 for each of the 10 days of testing) were also drawn from the Rinsland (1945) list and were those words that ranked next in frequency after the test words. On each day, eight of these filler words were used in the test positions for the first list and eight were used in the buffer positions for the last list.

The new words for each list were selected randomly without replacement by computer from the 1000 word pool until the pool was exhausted. This was done independently for each S so that the composition of the lists varied among S's. The filler items were drawn from the 160 item pool in the same way. The order of items in each list was also random with the restriction that a particular item had to appear in either positions 1-4 or 13-16 on its first presentation and in position 5-12 on its second presentation. Booklets were provided the experimenters for the recording of responses.

Presentation: Prior to the beginning of the experiment, S's were given the following instructions about the nature of the task:

> "We're going to play a game with words. I'm going to read some words to you and when I finish, I'll ask you to say them back to me. You can say them in any order. Try to say as many as you can. First, I'll do it a few times for practice."

The S's were then read two practice lists. The first list contained five items. If the S did not recall two words, he was presented the list again. If he still did not attain the criterion of at least two correct items, he was discarded. If two items were correctly recalled on either the first or second presentation of the first practice list, a second practice list of 16 items was given. The criterion for this list was that the S has to recall at least three words correctly on either the first or second presentation.

The same procedure was used with each test list. The items were read aloud at approximately a one-per-second rate. Then S recalled orally as many of the items as he could in any order. He was allowed as much time as needed for this. At the conclusion of recall, the next list was read and responded to. Because S's tended to remember the recency buffer items to the exclusion of the test items, they were instructed to try to recall the middle

items first. Food reinforcements were used for the correct recall of test items. Insofar as possible, S's were run daily during the weekdays. All responses, including incorrect ones, were recorded in answer booklets.

Measure: The measure for each of the 1000 words was the number of times that word was recalled correctly in test position. Since each word occurred only once in test position for each child, the total possible correct responses for each item was 50.

Experiment II

Subjects: A total of 27 S's, 14 male and 13 female, were run in this replication. These S's ranged in age from 58 months to 86 months with the mean age being 73 months. The S's were chosen from elementary schools and kindergartens in Charleston, West Virginia. Ten of the S's were first graders, and 17 were pre-schoolers.

Materials: In this replication of the pool of 1000 words remained the same. The composition of the lists, however, was modified. The new lists contained 10 items instead of 16 as in Experiment I. The shortened lists were composed of four recency buffer items, one primacy buffer item and 5 middle test items. As in Experiment I, the primacy and recency items on trial n became the test items on trial n-1. Each S was tested on all 1000 words and on each of the 12 days received either 14 or 18 lists of 10 items each. Again the word lists were generated by computer with a different order of words for each S.

In all other respects Experiment II was an exact replication of Experiment I.

Experiment III

The third experiment was an exact replication of Experiment II in which the 10 item stimulus list was again used. A total of 9 subjects were run, 5 male and 4 female. S's ranged in age from 57 months to 75 months, with the mean age being 68 months. These S's were chosen from kindergartens in Clemson, South Carolina.

## Results

Data from the three experiments were pooled and the 1000 words were rank-ordered according to the total number of times each word was recalled in test position. The 1000 words, ordered from high to low in terms of response availability, are listed in the Appendix. This listing also gives ranked-group numbers indicating the relative ease with which each word was recalled in each of the three studies.

An inverse relation was found between ease of recall and frequency of occurrence. The correlation was rho = -.631 ($p < .001$) between recall score and frequency according to Rinsland (1945). Investigation of the rank-ordering presented in the Appendix indicates that the most easily recalled words are nouns, first names, and adjectives. The most frequently occurring words, on the other hand, are function words--articles, prepositions, auxiliaries, and conjunctions.

## Discussion

The scaling presented in the Appendix demonstrates that there are large differences in the recallability of the 1000 words most frequently used by children. It can be assumed that items recalled with a high frequency by most children, will be readily available as responses in learning S-R associations.

Response availability, however, is not the only factor related to ease of look-and-say learning. As suggested by Coleman (1970, Experiment I) stimulus discriminability also affects the ease of learning whole words. Further studies will investigate the stimulus dimensions related to ease of learning and generate a rank-ordering of words according to stimulus discriminability. Such a rank-ordering can then be used in conjunction with the scaling presented in the Appendix to select the optimum list of words to teach the subskill of look-and-say learning.

# III

# PHONIC BLENDING

Phonic blending, Subskill 7, Table 1, refers to the ability to reproduce a word by synthesizing its component parts, e.g., the child hears the isolated sounds /t/ and /o/ and blends them into the word to. The child's ability to sound out unfamiliar words depends, in part, upon his mastery of phonic blending.

Two experiments in blending have been completed and tabulated in this research year. The first experiment presented the two-phoneme syllables used by Coleman (1970, Experiment III) in order of easy to difficult to obtain the concept induction rate. The second experiment extends the attempts to arrive at an optimal blending list through use of six training lists containing as well, stimuli of more than two phonemes and two or more syllables. The effectiveness of the various lists, and ease of blending for the various types were determined through comparison of results on a final blending test administered to all Ss.

## Blending Experiment I

Coleman (1970) reports an experiment that rank orders the 578 two-phoneme syllables as to blendability. Coleman also rank orders the various phonemes of the two types of syllables and reconfirms the results of Laumbach (1968). Laumbach found (1) that the learning of blending is a process of concept induction rather than simple paired-associate learning and (2) that certain phonological features significantly effected the ease of blending. Coleman further argues that the ease with which the child masters the total concept of blending will depend mainly upon the ease with which the child can master phonic blending in certain cases. Therefore, the child should be able to master this skill more easily if the easy examples are presented first, the more difficult ones only later.

To that end 17 kindergarten level children were presented a list of 287 two-phoneme syllables in order of easy to difficult. The resultant concept induction curves for the easy to difficult order are discussed and compared to those of Coleman for the random presentation order.



### Procedures

Subjects. The subjects were 17 preschool children between the ages of 65 and 74 months. None of the children had any previous training in phonic blending. Each child responded to all 287 two-phonemes in his particular list in order of easy to difficult.

Stimuli. The 578 two-phoneme syllables used in the Coleman (1970) experiment were placed into eight sets of increasing difficulty according to the performance of the Coleman subjects. The number of Coleman Ss that blended a particular word correctly defined the major subset to which that word was to belong. Namely, a word which all seven Coleman Ss blended correctly was placed in set one, one which six blended correctly was placed in set two, and so on. Each of the eight sets was in turn divided into two subsets, one consisting of the easier vowel-consonant syllables, the second consisting of the more difficult consonant-vowel syllables. Each of the 16 ordered sets thus formed were then split using a random selection procedure to form two equivalent lists of 287 syllables ordered from easy to hard. Each of these lists presented the full range of difficulty in half the number of presentation used in the Coleman study.

As with Coleman, syllables which began or ended with the same sound were never presented in sequence. The experimenter pronounced the two phonemes of each syllable with an interval of approximately one second. Each consonant was pronounced with a minimum of vowel sound following.

Responses. As in the Coleman study, the child was asked to pronounce the entire syllable upon hearing the two sounds. Sufficient time, occasionally as much as 20 seconds, was given for each response.

Presentation. The presentation was the same as for Coleman. The child was told:

> "Today we are going to learn to put sounds together to make a word. Listen to these sounds, **tea cher,** they make teacher. Listen to these sounds, ba by. If we put them together, they make baby. Now, can you tell me what these two sounds make when we put them together? **can dy?**

The child was tested on the above words several times or until the experimenter was certain that the child understood the nature of the task. The child was then told:

> "Each time I will give you two sounds, and I want you to put them together to make a word. It may not be a real words. It may be one I made up. Do you see these chips? (and he was shown a stack of 15 chips and a glass.) Every time you get a word right, you can put a chip in the glass. When you get all the chips in the glass, you will win a toy."



The experimenter then pronounced the two phonemes of the

first syllable in the list, and the child was asked, "What word do we get when we put those two sounds together? If you don't know, guess."

If the child could not give the correct syllable, the syllable was blended for him. If he gave the correct blend, he was praised and reminded to put a chip in the glass.

Each of the 17 children was presented with one of the two lists of 287 syllables ordered from easy to difficult. No set number of syllables was presented in any one session. The length of the session depended on how long the experimenter could hold the child's attention.

Measure. The mean number of errors was recorded for each syllable.

## Results

The resulting concept induction curves are given in Figure 1. The curves reported in the Coleman (1970) study are presented for comparison. The percentage of syllables blended correctly for each phoneme is plotted as a function of trials. The point plots for the vowel-consonant syllables were connected, likewise those for the consonant-vowel syllables. (Since VC stimulus sets five through eight contained a total of only three items and CV sets six through eight only twelve items, data for these groups has not been included in Figure 1.)

In spite of the rapidly increasing difficulty of the syllables presented in this study, the rate increase in the percentage blended correctly was approximately the same for both studies. Likewise, as for Laumbach and Coleman, the percentages for VC syllables were higher than those for CV syllables.

In Figure 2 the VC and CV group percentages are plotted as a function of the number of preceding VC and CV trials respectively. Only for the last most difficult 30% of the VC syllables and the last 15% of the CV syllables do the rates change direction. Excluding the last few most difficult syllables the Ss percentage increase was 18% per 100 trials for VC and about 25% for CV syllables.

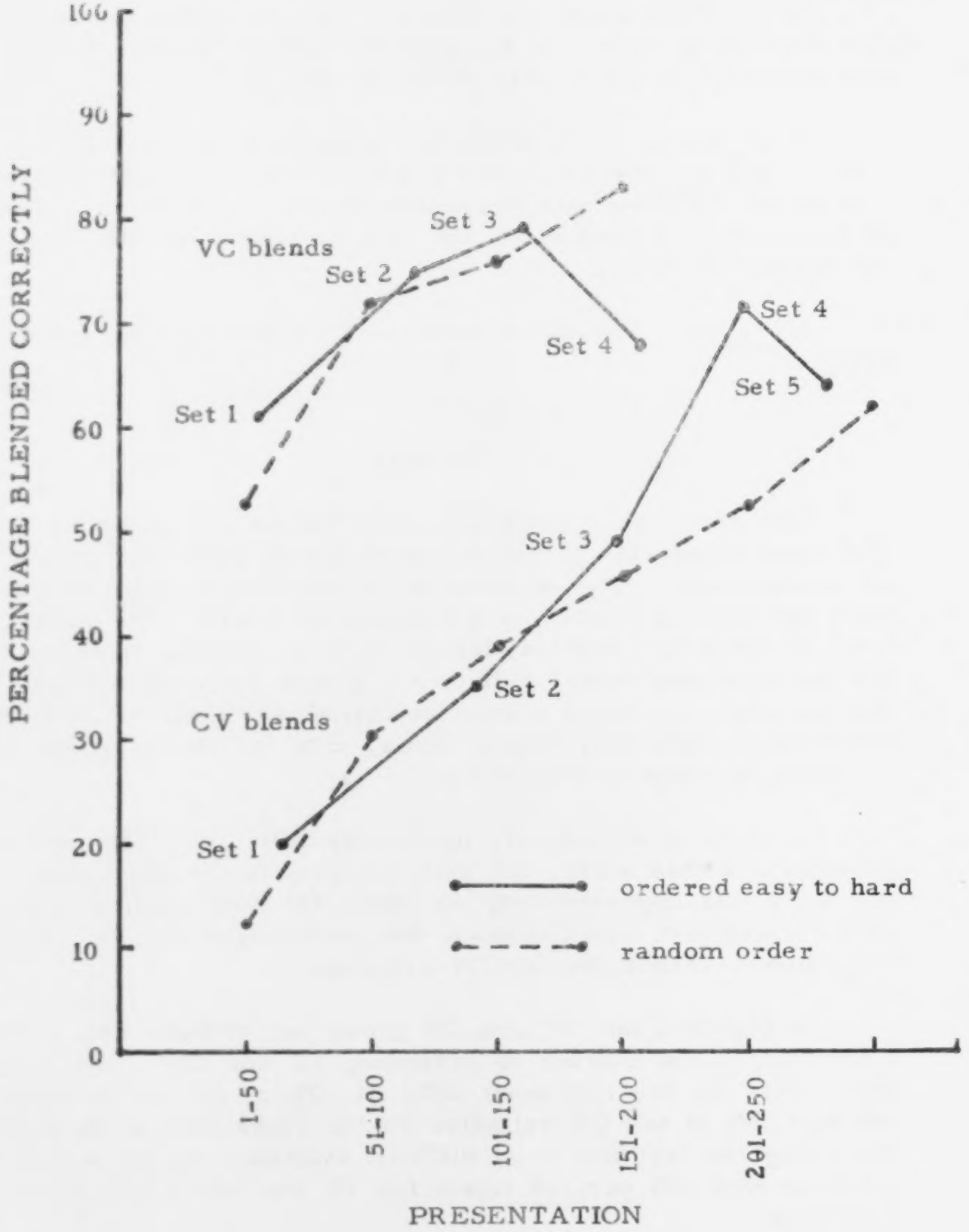


Fig. 1. Percentages of syllables blended correctly as a function of trials for easy to hard order (present study), and random order ( Coleman study.)

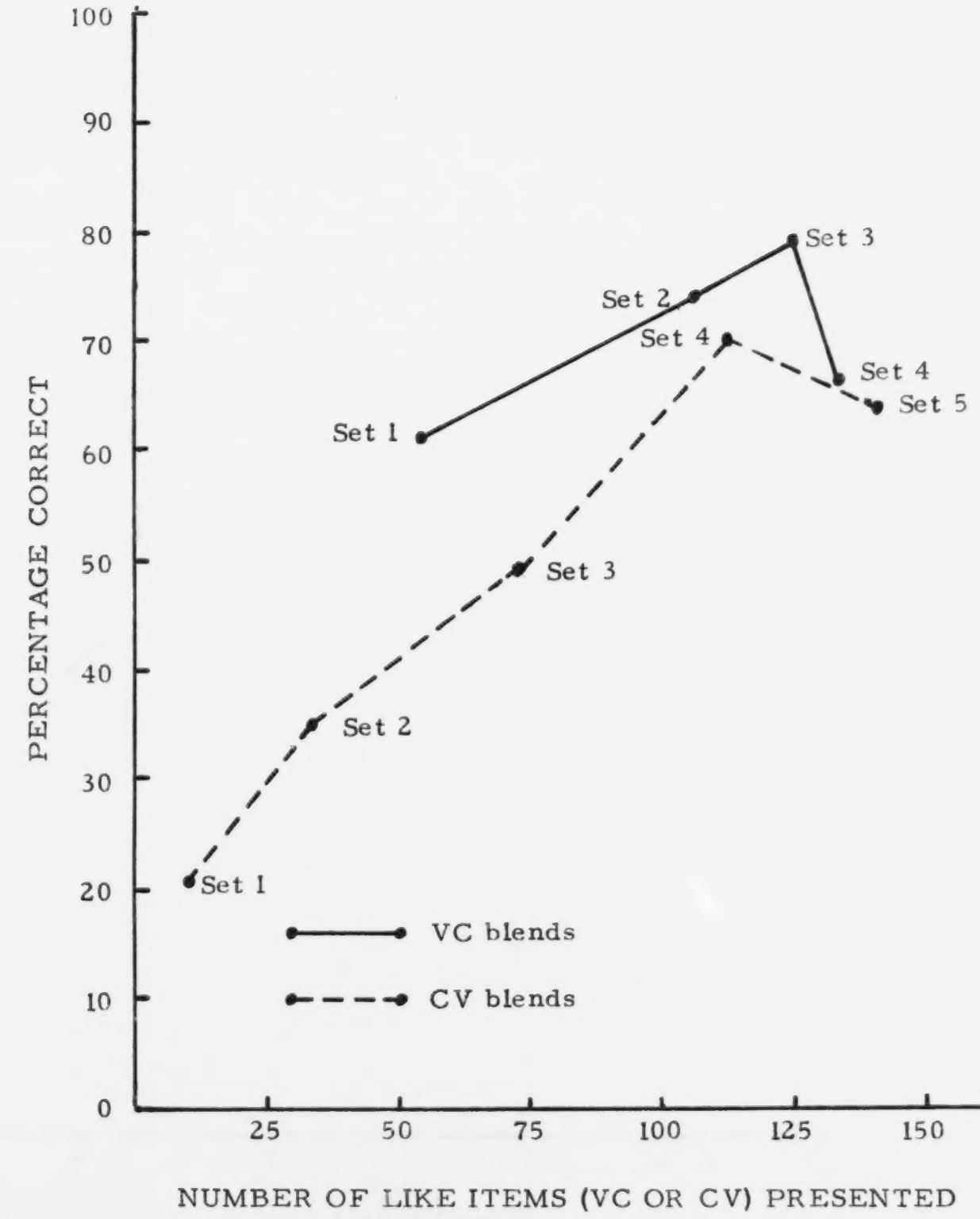


Fig. 2. Percentage correct for VC and CV stimulus sets plotted as a function of the number of preceeding trials of like stimuli (VC or C V.)

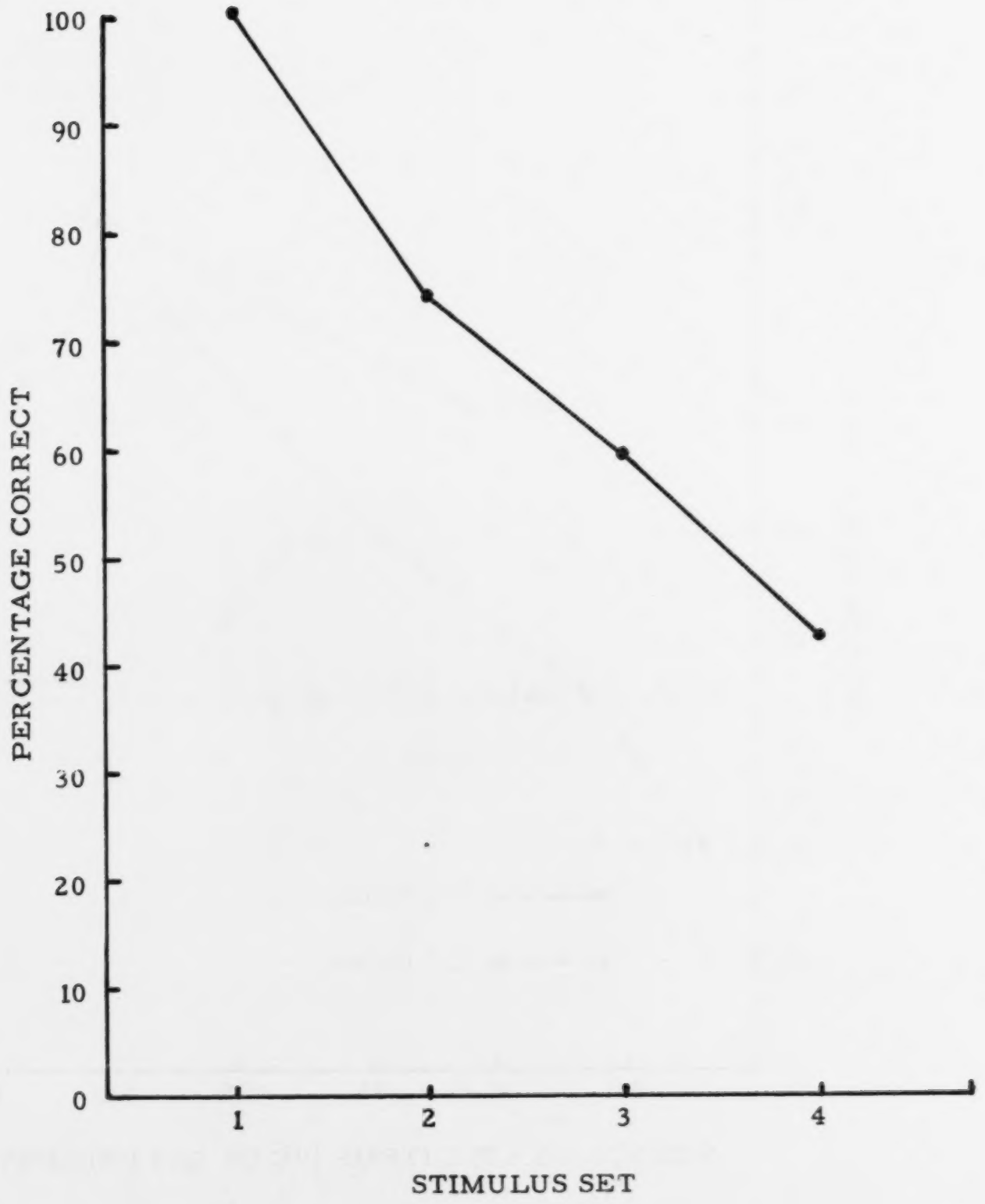


Fig. 3. Percentage of VC syllables blended correctly (Colman study) by stimulus set.

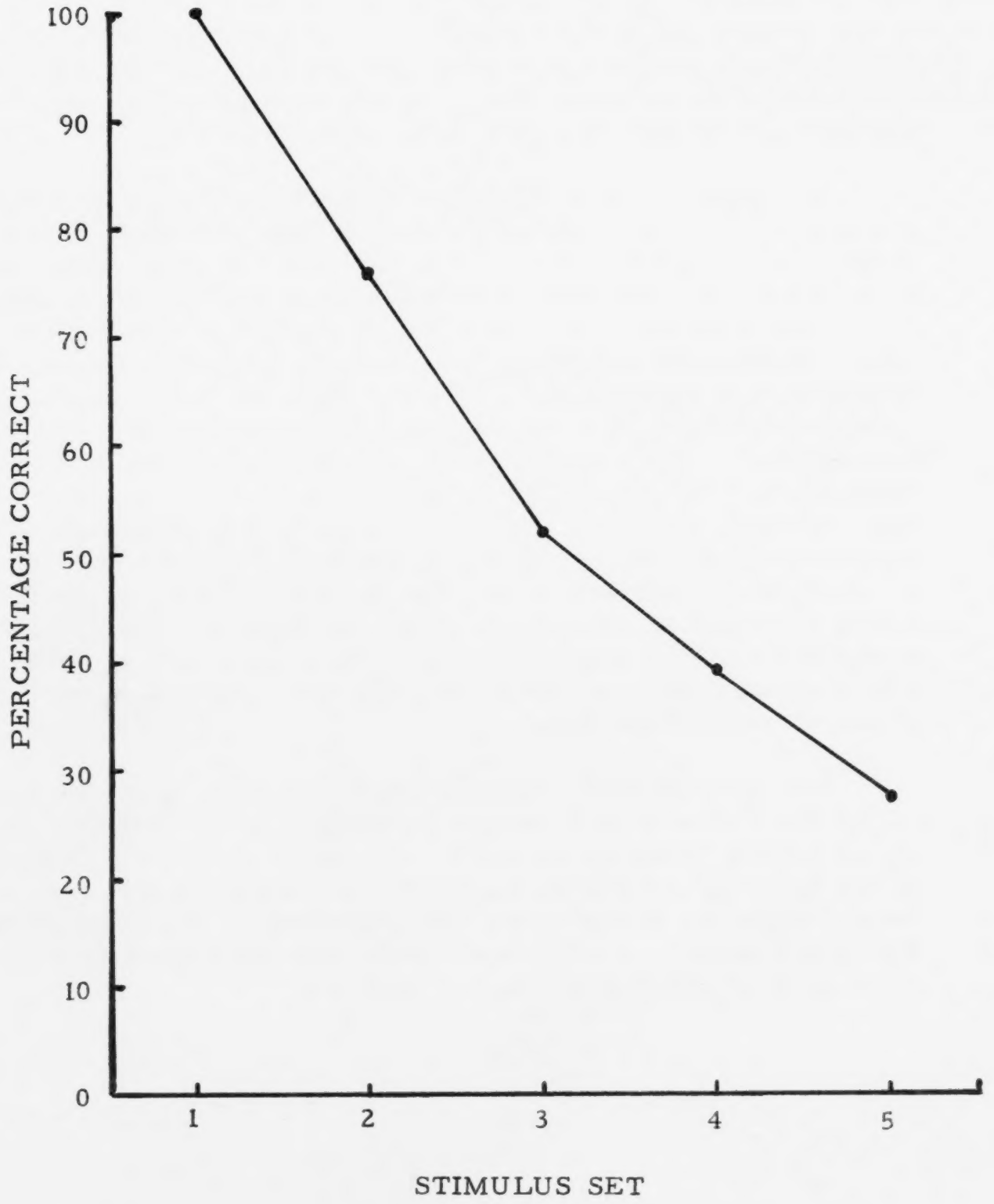


Fig. 4. Percentage of CV syllables blended correctly (Coleman study) by stimulus set.

The increase in difficulty from subset to subset is described in terms of the difference in percentage correct in the Coleman study. Figures 3 and 4 give the percentage correct for each VC and CV syllable subset as determined in the Coleman study. Since in the present study the difficulty of the syllables increased from set to set yet performance remained the same as for Coleman, the increase in the difficulty of syllables might be viewed as the net increase in the rate of concept induction.

Discussion. In the present study syllables were weighted in terms of ease of blending according to data presented in an earlier experiment (Coleman, 1970). On the bases of this weighting, lists were composed such that early training consisted of predominately VC blends interspersed with a few of the more difficult CV blends. Later, during predominately CV training, some small groups of VC syllables were interspersed. Thus, while the majority (84%) of syllables falling in set one, the easiest set, were VC syllables, not all were. As a result of the present experiment it became apparent that the CV syllables that did occur in the "easiest" set were actually much more difficult than the VC syllables in that group. It appears that, due to the small number of Ss and the random method of presentation followed in the earlier study, some of the CV syllables occurred in the easiest group for reasons other than their actual ease of blending. Pooling of data from both of these studies will provide a more accurate scaling of two-phoneme syllables in terms of ease of blending.

The present study demonstrated that some gain can be effected (particularly in a child's learning of more difficult blends) by presenting items in an order of easy to difficult. Comparison of the induction curves in Figure 1, however, suggest that little overall increase in efficiency was produced by the ordered lists. For this reason a second experiment was performed to investigate other factors relating to ease of blending.

## Blending Experiment II

This experiment sought the effects of certain linguistic dimensions in blending performance and in blending training. The linguistic dimensions examined were : Type of phonological context for the break, consonant-vowel or vowel-consonant (CV or VC); Units to be blended, syllables or phonemes (S or P); Size of units to be blended, single or double.

Studies by Laumbach (1968) and Coleman (1970) indicated that words can be blended more easily when broken between the vowel and the consonant (VC) than when broken between the consonant and vowel (CV). In the initial training sessions of these studies it was observed that from the start nearly all children could blend four-syllable words such as macaroni (SS/SS) and most could blend two-syllable words such as baby (S/S). Yet few could blend most two-phoneme words (P/P). It was projected therefore that among the one-syllable words, those which had two phonemes on either side of the break (PP/PP) would be easier to blend than those consisting of only one phoneme on either side (P/P).

By training groups of subjects using lists of CV and VC blends arranged in three different orders: easy-hard, hard-easy, random, and subsequently testing them in blending the eight types of blends much could be learned about (1) the relative ease and difficulty of the various types of blends, and (2) the training effects of these various dimensions on subsequent performance.

### Procedures

Subjects. The 120 subjects were preschool children aged 56 to 80 months. Approximately the same numbers of boys and girls were tested in each group. The children tested represented a cross-section of local preschools and included 36 children from a preschool at Ft. Bliss which represented a cross-section of the country and of socioeconomic class.

Stimuli. Each child was asked to blend 24 different words on each of four testing days and to take a final test on a fifth day of 32 words. The words were drawn largely from Rinsland's (1945) list of most frequently used words for first graders. Additional words and a nonsense syllable were added to effectuate a balance in word categories.

The words were arranged into three groups according to presentation orders for each the VC and CV list as shown in Table 3. The presentation order, then, for Groups 1 and 4 was easy to hard;

for Groups 2 and 5, hard to easy; and for Groups 3 and 6, mixed. The words for a given day and a given group were randomized separately into four words orders. These orders were given to equal numbers of the 20 subjects in each group.

Table 3. Presentation orders of six treatment groups.

| Groups | List | Order | Day 1 | Day 2 | Day 3 | Day 4 |
|---|---|---|---|---|---|---|
| 1 | CV | E-H | SS/SS | S/S | PP/PP | P/P |
| 2 | CV | H-E | P/P | PP/PP | S/S | SS/SS |
| 3 | CV | A random mix across all days | | | | |
| 4 | VC | E-H | SS/SS | S/S | PP/PP | P/P |
| 5 | VC | H-E | P/P | PP/PP | S/S | SS/SS |
| 6 | VC | A random mix across all days | | | | |

The final day of testing was the same for all subjects and included four words belonging to each of the eight categories: VC--SS/SS, VC--S/S, VC--PP/PP, VC--P/P, CV--SS/SS, CV--S/S, CV--PP/PP, and CV--P/P. The list was arranged in 20 different random orders, one for each subject within each treatment group.

The words themselves were balanced in such a way that the proportion of the phoneme types was constant across the eight blending groups.

Presentation. Six experimenters conducted this experiment, and with few exceptions, each experimenter tested an equal number of children in each of the six groups. Extenuating circumstances made it necessary for much of Group 6 to be distributed between two of the experimenters.

Individual testing was conducted in five 10-minute sessions. The four stimulus lists for a child were given as much as possible on consecutive days, or on four days in a five-day school week. The fifth session was final testing and was given as much as possible on the Monday following the other sessions. Where absences

made it necessary to deviate from this basic format, two days were always better to intervene between the fourth session and final testing.

Testing was done in rooms apart from the classrooms. Disruptive noises and stimuli were kept at a minimum. The subject and experimenter generally sat opposite one another at a table. The experimenter began by giving the following instructions:

> "We are going to play a game with words. Every time you give me a right answer, I will put a chip in this cup, and when you get all these chips (8) in the cup, you'll get a prize. I am going to say two little words (or sounds) to you, and I want you to put them together to make one big word. I'll do one for practice so you'll see what I mean: I say rain--bow , and you say back to me rainbow. Now you may put these sounds together even if you don't know the sounds and words."

The experimenter then proceeded with the task, saying each word in order and allowing about one second between the first and second parts of each word. Each time the child blended correctly, the experimenter complimented him and the child put a poker chip in the cup. When the child had accumulated eight chips in the cup, he chose a prize from the bag of small toys. Then the procedure was repeated until all the words for the day were completed. Any chips left in the cup at the end of a day's session were used as a headstart for the next session. When a child gave an incorrect answer, the experimenter recorded the response and instructed the child in the correct answer. When a child was doing very poorly, the experimenter gave the child an opportunity for a success by asking a multiple choice question on a word he missed, e.g., for "she", he would ask, "Should you have said 'sh' or 'she' or 'e'?" If the child then responded correctly, he put a chip in the cup but the experimenter scored the response as incorrect. By repeating this procedure as often as necessary each child won at least one prize in each day of testing. On the fifth day of testing, the final test was given and neither were chips used nor feedback given the child as to whether his answers were correct or incorrect. The child was allowed to choose a prize at the end of the session. The experimenter explained the procedural variation at the onset.

## Results

The data were analyzed in terms of number of words blended correctly for each of the eight stimulus groups of four items each. Thus, for each subject there was a maximum score of four for each stimulus group, a minimum score of zero. Since the occurrence of zero was not rare, the scores were converted by the formula, Converted Score = $\sqrt{X} + \sqrt{X+1}$. An analysis of variance was then performed on the converted scores. The results of this analysis are summarized in Table 4.

The main effects of Type of test item break, CV-VC, and linguistic Unit between which there was a break, Syllable-Phoneme, were significant. Those main effects for the Size of units to be blended, Single or Double syllable or phoneme, training List of CV or VC training items, and Order of presentation for stimulus types were not significant. Of the first order interactions training List x Type of test item break, Order of presentation x Unit blended, and Type of test item break x Unit blended were significant. Significant second order interactions were List x Order x Type of test item break, List x Order x Unit blended, and Type of test item break x Unit blended x Size of unit blended. The remaining first and higher order interactions were not significant sources of variance. Summaries of the significant effects are presented in Figures 5, 6, and 7.

Figure 5 presents percent blended correctly as a function of unit blended, type of test item, and size of units blended (T x U x S). Inspection of this figure suggests that the difference in performance on syllable blends and phoneme blends was greater for CV type items than VC type test items. Furthermore, for the CV type test items the difference in performance on syllable blends and phoneme blends was greater for single units. Therefore, the greatest difference occurs between CV type S/S and P/P words, the least difference between VC type SS/SS and PP/PP words.

The significant interaction of type of test item break and unit blended (T x U) can be inferred from Figure 5. While percentage of syllables blended is only 4.6% lower for CV test items than those for VC test items, the percentage for phonemes is 17.7% lower.

The significant main effects of unit blended (U) and type of test item break (T) may also be inferred from Figure 5. The percentage blended correctly was 62.7% for syllable blends, and 44.4% for phoneme blends. Percentage blended correctly was 48.0% for CV words., and 59.1% for VC words.

Table 4. Summary of Analysis of Variance for Blending of Various Word Types After Training

| SOURCE | df | MS | F |
|---|---|---|---|
| Between Ss | 119 | | |
| List for training (L) | 1 | 10.19 | 2.16 |
| Order of presentation for stimulus types (O) | 2 | 9.15 | 1.94 |
| L x O | 2 | 4.30 | .91 |
| $error_1$ | 114 | 4.71 | |
| Within Ss | 840 | | |
| Type of break for test item (T) | 1 | 39.20 | 64.58** |
| L x T | 1 | 6.50 | 10.71** |
| O x T | 2 | .44 | .72 |
| L x O x T | 2 | 1.93 | 3.18* |
| $error_2$ | 114 | .61 | |
| Unit between which break is made for test item (U) | 1 | 73.21 | 97.27** |
| L x U | 1 | .17 | .23 |
| O x U | 2 | 5.44 | 7.23** |
| L x O x U | 2 | 2.60 | 3.45* |
| $error_3$ | 114 | .75 | |
| Size of units to be blended in test (S) | 1 | .06 | .12 |
| L x S | 1 | 1.28 | 2.63 |
| O x S | 2 | .70 | 1.43 |
| L x O x S | 2 | .20 | .41 |
| $error_4$ | 114 | .49 | |
| T x U | 1 | 17.35 | 38.32** |
| L x T x U | 1 | 1.09 | 2.41 |
| O x T x U | 2 | .51 | 1.13 |
| L x O x T x U | 2 | .20 | .04 |
| $error_5$ | | | |
| T x S | 1 | .36 | .90 |
| L x T x S | 1 | .12 | .30 |
| O x T x S | 2 | .07 | .18 |
| L x O x T x S | 2 | .56 | 1.40 |
| $error_6$ | 114 | .40 | |

Table 4. (Continued)

| SOURCE | df | MS | F |
|---|---|---|---|
| U x S | 1 | 5.19 | 10.12 |
| L x U x S | 1 | .59 | 1.16 |
| O x U x S | 2 | .03 | .06 |
| L x O x U x S | 2 | .10 | .19 |
| $error_7$ | 114 | .51 | |
| T x U x S | 1 | 2.81 | 8.39** |
| L x T x U x S | 1 | .33 | .97 |
| O x T x U x S | 2 | .31 | .91 |
| L x O x T x U x S | 2 | .09 | .03 |
| $error_8$ | 114 | .34 | |

* $p = .01$
** $p = .05$

$error_1 = Ss + SsxL + SsxO + SsxLxO$
$error_2 = SsxT + SsxLxT + SsxOxT + SsxLxOxT$
$error_3 = SsxU + SsxLxU + SsxOxU + SsxLxOxU$
$error_4 = SsxS + SsxLxS + SsxOxS + SsxLxOxS$
$error_5 = SsxTxU + SsxLxTxU + SsxOxTxU + SsxLxOxTxU$
$error_6 = SsxTxS + SsxLxTxS + SsxOxTxS + SsxLxOxTxS$
$error_7 = SsxUxS + SsxLxUxS + SsxOxUxS + SsxLxOxUxS$
$error_8 = SsxTxUxS + SsxLxTxUxS + SsxOxTxUxS + SsxLxOxTxUxS$

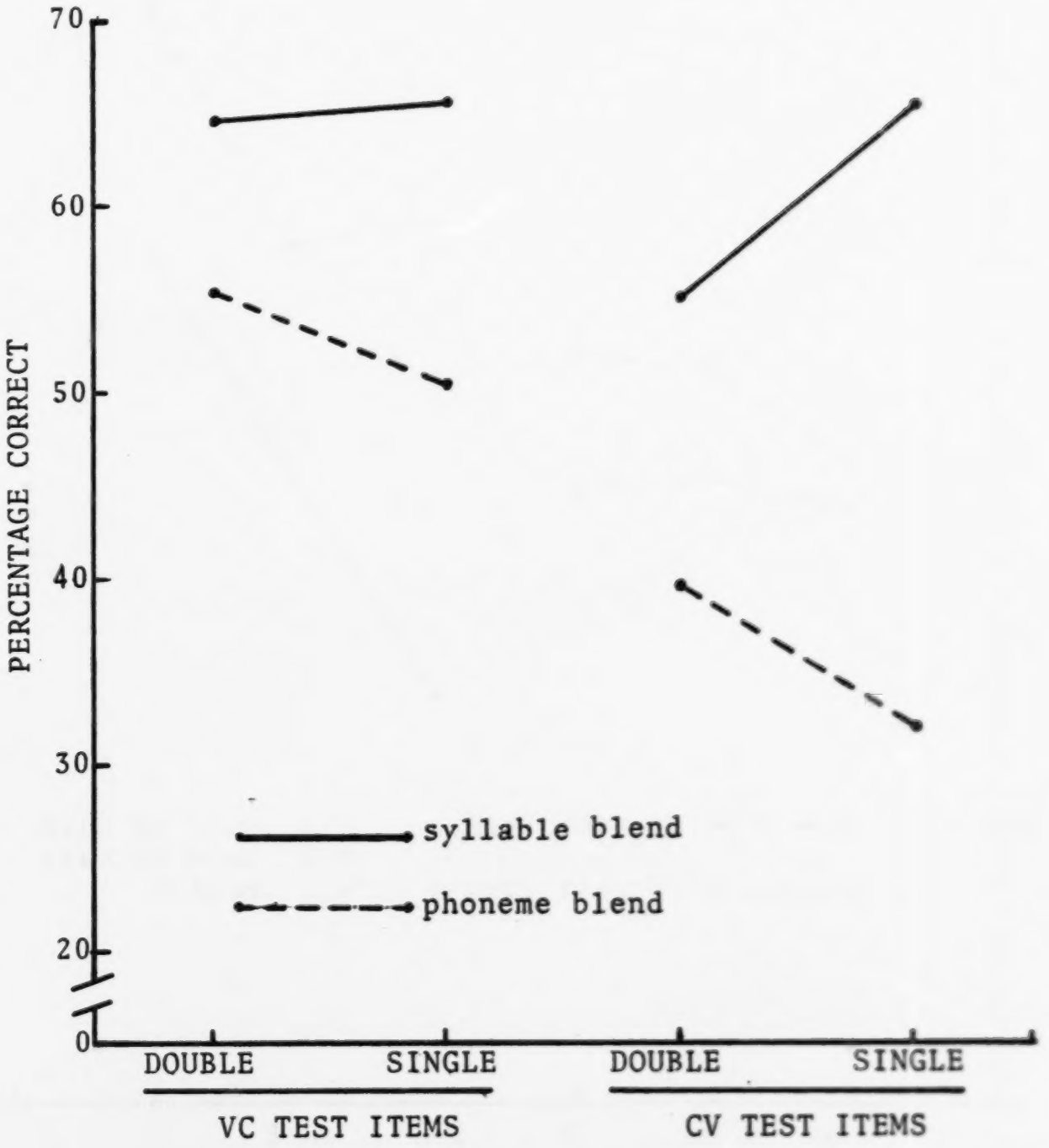


Fig. 5. Percent blended correctly as a function of unit blended, type of test item, and size of units blended (T x U x S).

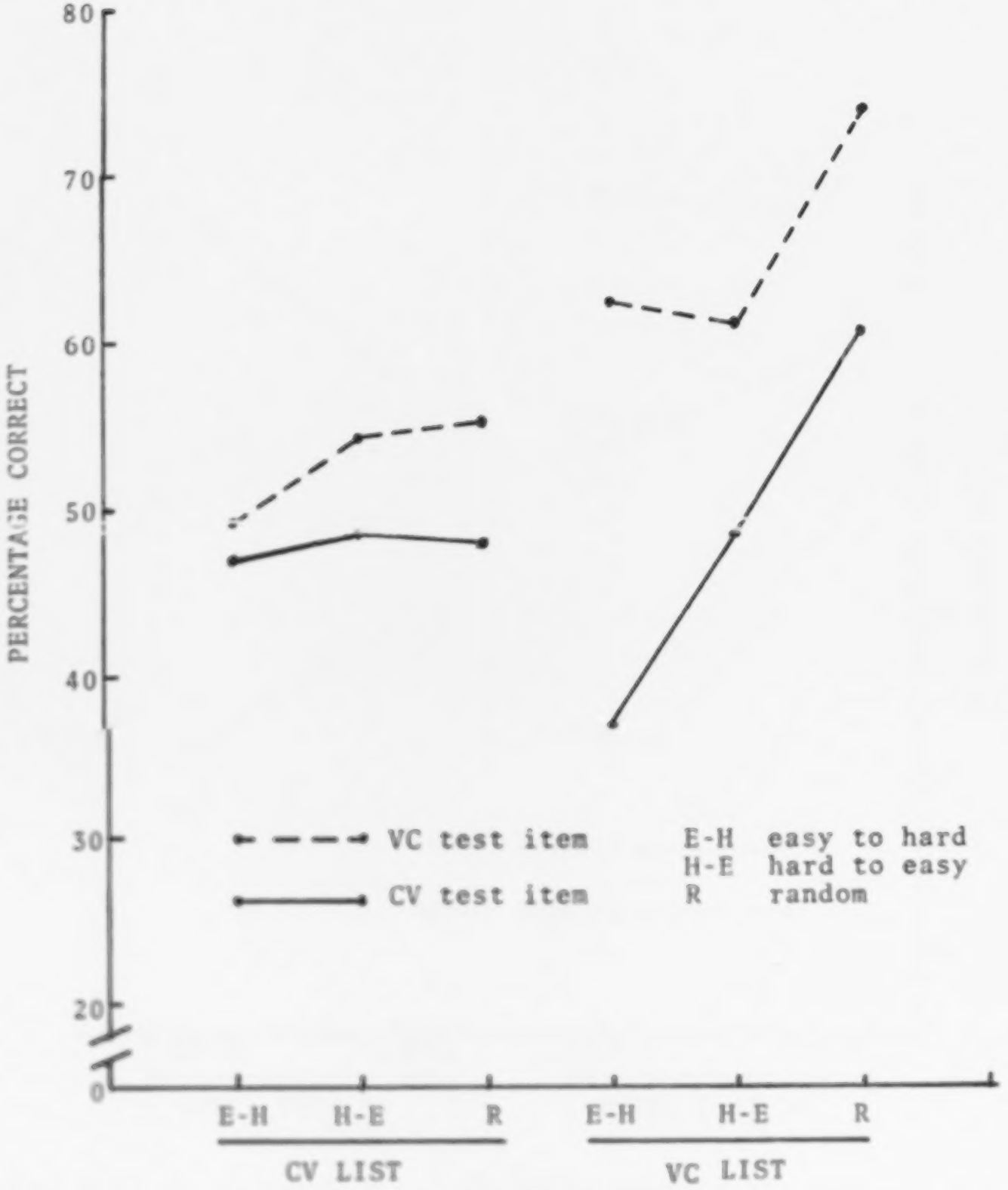


Fig. 6. Percent blended correctly as a function of test item type, training list, and presentation order (L x O x T).

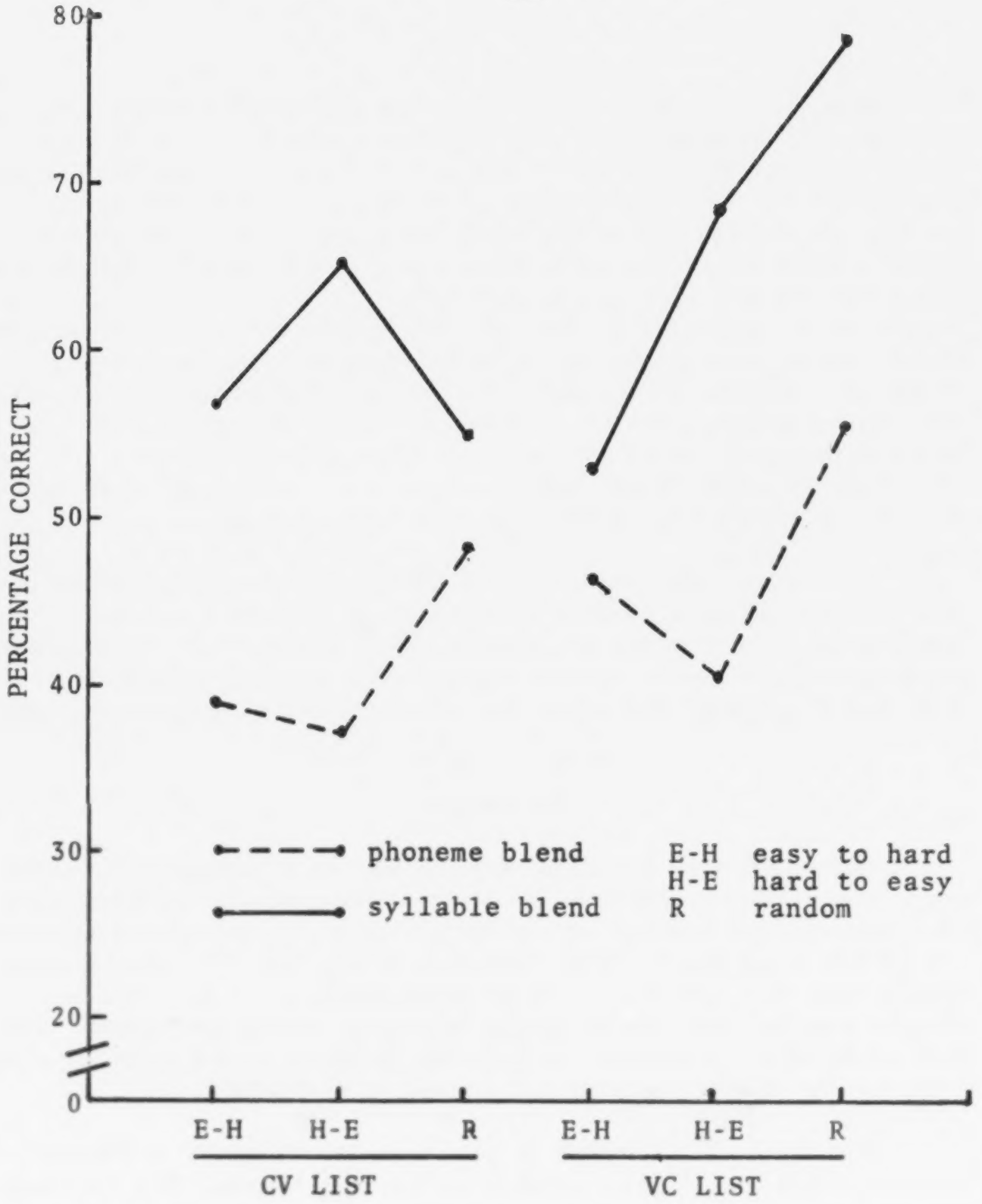


Fig. 7. Percent blended correctly as a function of unit blended, training list, and presentation order (L x O x U).

Figure 7 presents percent blended correctly as a function of unit blended, training list, and presentation order (L x O x U). The figure shows a recency effect for the easy-hard and hard-easy training orders for both CV and VC training lists. For the hard-easy groups where syllable blends were presented on the last day before the test (see Table 3), the scores were relatively high for syllable blend test items, low for phoneme blend test items; when the phoneme blends were presented on the last day before the test, the phoneme blend scores were high, the syllable blend scores low. After random order CV training the number of correct syllable blends was lower than either other order; after random order VC training the number of correct blends was even higher. The phoneme blend scores were substantially higher after both random order trainings than after any of the easy-hard or hard-easy order trainings.

The significant interaction of training order presentation and unit blended (O x U) can be inferred from Figure 7 as well. The same pattern held as in the higher order interaction. Collapsing across lists the mean percent correct for syllable blends after random order training was about the same as for hard-easy training.

## Discussion

The results of linguistic dimensions on blending performance were generally as expected. Syllables were easier to blend than phonemes. The findings of previous studies of two-phoneme blending (P/P) (Laumbach, 1968, Coleman 1970), that VC blends were easier than CV blends have been resubstantiated. In addition, these results can be extended to double phoneme blends (PP/PP). The effect of the CV break type on syllable blending would seem to occur only for the double syllable CV blends (CV: SS/SS)

The increase of length in phoneme blends (P/P to PP/PP) corresponded to a higher number of correct blends, thus reinforcing the earlier contention that greater length of the parts to be blended would contribute to the recognizability of the whole blending word. The single syllable (S) as a unit consisted of several phonemes and as such was even greater in size than the double phoneme unit (PP). Single syllable blends were also easier than double phoneme blends. The double syllable (SS) was still greater in size, but it was not observed to be easier. It is suggested that the potentially greater recognizability of these longer units was offset by the childrens' lack of familiarity with many four syllable words and the subsequent difficulty of holding them in memory for a correct response.

Neither the linguistic dimension CV-VC break training list, the orders of the groups representing the three other linguistic dimensions, nor any combination thereof had any significant effect on the overall blending score for the test. VC training resulted in slightly higher overall test scores; furthermore random order training seemed to result in slightly higher final test scores. Correspondingly the highest final test scores occurred after random order VC list training.

CV training resulted in similar scores for CV and VC test items; VC training resulted in considerably higher VC test item scores and the same CV item scores. Thus, VC training seemed better for teaching VC blends; it was no worse than CV training for teaching CV blends.

The linguistic units blended (S or P) on the last day before the test increased the scores of the corresponding items on the test and decreased that of the others. For the hard-easy groups where syllable blends were presented on the last day before the test the scores were relatively high for syllable blend test items, low for phoneme blend test items; when the phoneme blends were presented on the last day before the test , the phoneme blend scores were high, the syllable blend scores low. That is, training for one did not transfer well to performance of the other.

After random order CV training the number of correct syllable blends, was lower than either other order; after random order VC training the number of correct blends was even higher. The phoneme blend scores were substantially higher after both random order trainings than after any of the easy-hard or hard-easy order trainings.

Apparently phoneme and syllable blending involved different linguistic blending concepts and therefore different blending tasks. The subject was not only required to perform a task; he was also required to determine which task to perform. Optimal training could probably be achieved by training from easy to hard within one concept area. However, if training is to optimize performance in a combination of concept areas such as syllable and phoneme blending as presented in the final test here, the training of the two must be interspersed, perhaps much as the VC and CV syllables were in the the blending order above. Future studies will focus on order, optimal numbers of presentations, and interspersal as a function of these and other linguistic blending concepts.

# APPENDIX

## A RANK-ORDERING OF WORDS ACCORDING TO EASE OF RECALL

## Explanation of Rank-Ordering

On the following pages is presented a list of 1000 frequently occurring words, rank-ordered according to ease of recall. (See Chapter II for a description of the experimental method used to determine ease of recall.)

The words are listed from high to low according to the total number of times they were recalled in the three replications at the University of Texas at El Paso (UTEP), the University of West Virginia (UWVIR), and Clemson University. The number of times each word was recalled in each of the replications is also presented. Words which tied at a particular rank have been grouped and listed alphabetically at that rank.

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Santa Claus | 32 | 15 | 6 | 53 | 1.0 |
| Bowwow | 26 | 18 | 5 | 49 | 2.0 |
| Daddy | 26 | 18 | 3 | 47 | 3.0 |
| Halloween | 26 | 19 | 1 | 46 | 4.5 |
| Santa | 32 | 12 | 2 | 46 | 4.5 |
| Automobile | 23 | 17 | 4 | 44 | 6.5 |
| Judy | 30 | 12 | 2 | 44 | 6.5 |
| God | 25 | 17 | 1 | 43 | 8.0 |
| Merry-go-round | 23 | 14 | 5 | 42 | 9.0 |
| Bunny | 27 | 12 | 2 | 41 | 10.5 |
| Popcorn | 23 | 15 | 3 | 41 | 10.5 |
| Kindergarten | 23 | 14 | 3 | 40 | 12.0 |
| Baby | 26 | 12 | 1 | 39 | 14.0 |
| Grandma | 23 | 13 | 3 | 39 | 14.0 |
| Nancy | 22 | 13 | 4 | 39 | 14.0 |
| Christmas | 17 | 16 | 5 | 38 | 16.5 |
| Policeman | 23 | 14 | 1 | 38 | 16.5 |
| Doctor | 22 | 14 | 1 | 37 | 20.5 |
| Elephant | 24 | 12 | 1 | 37 | 20.5 |
| Football | 26 | 11 | 0 | 37 | 20.5 |
| Mamma | 26 | 9 | 2 | 37 | 20.5 |
| Pumpkin | 21 | 13 | 3 | 37 | 20.5 |
| Thanksgiving | 24 | 12 | 1 | 37 | 20.5 |
| Grandmother | 23 | 11 | 2 | 36 | 25.5 |
| Jack O' Lantern | 18 | 16 | 2 | 36 | 25.5 |
| Reindeer | 22 | 13 | 1 | 36 | 25.5 |
| Steve | 24 | 10 | 2 | 36 | 25.5 |
| Charles | 22 | 12 | 1 | 35 | 30.5 |
| Cowboy | 20 | 13 | 2 | 35 | 30.5 |
| Fox | 22 | 13 | 0 | 35 | 30.5 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Monkey | 21 | 10 | 4 | 35 | 30.5 |
| Potatoes | 21 | 12 | 2 | 35 | 30.5 |
| School | 26 | 8 | 1 | 35 | 30.5 |
| Father | 21 | 9 | 4 | 34 | 38.5 |
| Kitty | 21 | 11 | 2 | 34 | 38.5 |
| Marbles | 19 | 12 | 3 | 34 | 38.5 |
| Mother | 20 | 12 | 2 | 34 | 38.5 |
| Puppy | 23 | 10 | 1 | 34 | 38.5 |
| Shoot | 22 | 10 | 1 | 34 | 38.5 |
| Sue | 23 | 10 | 1 | 34 | 38.5 |
| Tonsils | 19 | 14 | 1 | 34 | 38.5 |
| Tricycle | 16 | 13 | 5 | 34 | 38.5 |
| Cat | 28 | 5 | 0 | 33 | 44.0 |
| Cathy | 16 | 16 | 1 | 33 | 44.0 |
| Grandfather | 16 | 16 | 1 | 33 | 44.0 |
| Beverly | 16 | 13 | 3 | 32 | 50.0 |
| Linda | 20 | 12 | 2 | 32 | 50.0 |
| Papa | 21 | 9 | 2 | 32 | 50.0 |
| Sandra | 18 | 12 | 2 | 32 | 50.0 |
| Scooter | 20 | 11 | 1 | 32 | 50.0 |
| Susan | 20 | 10 | 2 | 32 | 50.0 |
| Turkey | 21 | 10 | 1 | 32 | 50.0 |
| Valentine | 20 | 11 | 1 | 32 | 50.0 |
| Virginia | 18 | 11 | 3 | 32 | 50.0 |
| Ambulance | 20 | 9 | 2 | 31 | 60.0 |
| Balloons | 18 | 13 | 0 | 31 | 60.0 |
| Bicycle | 20 | 11 | 0 | 31 | 60.0 |
| Dad | 18 | 13 | 0 | 31 | 60.0 |
| Donna | 15 | 13 | 3 | 31 | 60.0 |
| Hospital | 19 | 11 | 1 | 31 | 60.0 |
| Library | 16 | 13 | 2 | 31 | 60.0 |
| Picnic | 19 | 10 | 2 | 31 | 60.0 |
| Post Office | 20 | 10 | 1 | 31 | 60.0 |
| Snake | 18 | 10 | 3 | 31 | 60.0 |
| Spinach | 21 | 8 | 2 | 31 | 60.0 |
| Bananas | 14 | 16 | 0 | 30 | 69.0 |
| Birthday | 20 | 9 | 1 | 30 | 69.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Cook | 21 | 8 | 1 | 30 | 69.0 |
| Engine | 17 | 11 | 2 | 30 | 69.0 |
| Mouse | 22 | 7 | 1 | 30 | 69.0 |
| Uncle | 16 | 11 | 3 | 30 | 69.0 |
| Upstairs | 16 | 8 | 6 | 30 | 69.0 |
| Bear | 17 | 11 | 1 | 29 | 82.0 |
| Blackboard | 15 | 12 | 2 | 29 | 82.0 |
| Boat | 19 | 9 | 1 | 29 | 82.0 |
| Bob | 16 | 9 | 4 | 29 | 82.0 |
| Dictionary | 16 | 12 | 1 | 29 | 82.0 |
| Finger | 15 | 12 | 2 | 29 | 82.0 |
| Girl | 21 | 7 | 1 | 29 | 82.0 |
| Gobble | 16 | 13 | 0 | 29 | 82.0 |
| Jim | 17 | 11 | 1 | 29 | 82.0 |
| Larry | 13 | 14 | 2 | 29 | 82.0 |
| Orange | 13 | 13 | 3 | 29 | 82.0 |
| Peanuts | 18 | 10 | 1 | 29 | 82.0 |
| Pony | 17 | 11 | 1 | 29 | 82.0 |
| Ruth | 13 | 9 | 7 | 29 | 82.0 |
| Sally | 17 | 10 | 2 | 29 | 82.0 |
| Shot | 18 | 10 | 1 | 29 | 82.0 |
| Stockings | 13 | 13 | 3 | 29 | 82.0 |
| Tools | 19 | 9 | 1 | 29 | 82.0 |
| Umbrella | 15 | 14 | 0 | 29 | 82.0 |
| Airplane | 20 | 8 | 0 | 28 | 102.0 |
| Barbara | 18 | 9 | 1 | 28 | 102.0 |
| Brother | 17 | 8 | 3 | 28 | 102.0 |
| Chicken | 19 | 8 | 1 | 28 | 102.0 |
| Children | 15 | 12 | 1 | 28 | 102.0 |
| Cream | 13 | 11 | 4 | 28 | 102.0 |
| Dance | 16 | 9 | 3 | 28 | 102.0 |
| Dog | 17 | 11 | 0 | 28 | 102.0 |
| George | 15 | 11 | 2 | 28 | 102.0 |
| Goldfish | 13 | 14 | 1 | 28 | 102.0 |
| Grandpa | 18 | 7 | 3 | 28 | 102.0 |
| House | 17 | 10 | 1 | 28 | 102.0 |
| Ice Cream | 17 | 11 | 2 | 28 | 102.0 |
| King | 16 | 2 | 0 | 28 | 102.0 |
| Nose | 19 | 8 | 1 | 28 | 102.0 |
| Nurse | 14 | 13 | 1 | 28 | 102.0 |

| Word | Times recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Radio | 15 | 10 | 3 | 28 | 102.0 |
| Rat | 16 | 8 | 4 | 28 | 102.0 |
| Sister | 16 | 10 | 2 | 28 | 102.0 |
| Skates | 20 | 7 | 1 | 28 | 102.0 |
| Teacher | 16 | 12 | 0 | 28 | 102.0 |
| Bath | 19 | 7 | 1 | 27 | 125.0 |
| Boots | 18 | 9 | 0 | 27 | 125.0 |
| Boy | 18 | 7 | 2 | 27 | 125.0 |
| Buggy | 20 | 7 | 0 | 27 | 125.0 |
| Candy | 16 | 9 | 2 | 27 | 125.0 |
| Cow | 16 | 11 | 0 | 27 | 125.0 |
| Dead | 21 | 6 | 0 | 27 | 125.0 |
| Debra | 16 | 11 | 0 | 27 | 125.0 |
| Easter | 17 | 10 | 0 | 27 | 125.0 |
| Farmer | 16 | 10 | 1 | 27 | 125.0 |
| Fish | 16 | 10 | 1 | 27 | 125.0 |
| Goat | 16 | 9 | 2 | 27 | 125.0 |
| Handkerchief | 15 | 12 | 0 | 27 | 125.0 |
| Horse | 18 | 8 | 1 | 27 | 125.0 |
| Kitten | 17 | 10 | 0 | 27 | 125.0 |
| Milk | 15 | 12 | 0 | 27 | 125.0 |
| Moon | 16 | 10 | 1 | 27 | 125.0 |
| Party | 18 | 9 | 0 | 27 | 125.0 |
| Pencil | 13 | 14 | 0 | 27 | 125.0 |
| Pig | 21 | 6 | 0 | 27 | 125.0 |
| Push | 18 | 8 | 1 | 27 | 125.0 |
| Rabbit | 16 | 10 | 1 | 27 | 125.0 |
| Rooster | 15 | 11 | 1 | 27 | 125.0 |
| Sunday | 18 | 8 | 1 | 27 | 125.0 |
| Vicki | 15 | 12 | 0 | 27 | 125.0 |
| Beautiful | 18 | 7 | 1 | 26 | 146.0 |
| Cake | 11 | 13 | 2 | 26 | 146.0 |
| Car | 14 | 12 | 0 | 26 | 146.0 |
| Dirty | 15 | 10 | 1 | 26 | 146.0 |
| Dolly | 14 | 10 | 2 | 26 | 146.0 |
| Fairy | 15 | 8 | 3 | 26 | 146.0 |
| Furniture | 13 | 10 | 3 | 26 | 146.0 |
| Grass | 15 | 9 | 2 | 26 | 146.0 |
| Grocery | 18 | 7 | 1 | 26 | 146.0 |
| January | 14 | 11 | 1 | 26 | 146.0 |
| Kill | 13 | 9 | 4 | 26 | 146.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Penny | 15 | 10 | 1 | 26 | 146.0 |
| People | 16 | 8 | 2 | 26 | 146.0 |
| Tony | 13 | 10 | 3 | 26 | 146.0 |
| Andy | 16 | 9 | 0 | 25 | 165.5 |
| Black | 13 | 12 | 0 | 25 | 165.5 |
| Blocks | 17 | 6 | 2 | 25 | 165.5 |
| Bus | 12 | 13 | 0 | 25 | 165.5 |
| Carol | 19 | 6 | 0 | 25 | 165.5 |
| Chair | 16 | 9 | 0 | 25 | 165.5 |
| Chimney | 16 | 8 | 1 | 25 | 165.5 |
| Clown | 16 | 8 | 1 | 25 | 165.5 |
| Coat | 15 | 9 | 1 | 25 | 165.5 |
| Duck | 14 | 10 | 1 | 25 | 165.5 |
| Eat | 17 | 6 | 2 | 25 | 165.5 |
| Farm | 15 | 7 | 3 | 25 | 165.5 |
| Fire | 16 | 9 | 0 | 25 | 165.5 |
| John | 12 | 12 | 1 | 25 | 165.5 |
| Kite | 13 | 11 | 1 | 25 | 165.5 |
| Lady | 18 | 6 | 1 | 25 | 165.5 |
| Playhouse | 16 | 8 | 1 | 25 | 165.5 |
| Postmaster | 8 | 15 | 2 | 25 | 165.5 |
| Shoes | 15 | 9 | 1 | 25 | 165.5 |
| Swim | 13 | 11 | 1 | 25 | 165.5 |
| Tractor | 17 | 8 | 0 | 25 | 165.5 |
| Water | 16 | 8 | 1 | 25 | 165.5 |
| Accident | 16 | 8 | 0 | 24 | 189.5 |
| Army | 13 | 9 | 2 | 24 | 189.5 |
| Basket | 14 | 10 | 0 | 24 | 189.5 |
| Bluebird | 13 | 10 | 1 | 24 | 189.5 |
| But | 13 | 9 | 2 | 24 | 189.5 |
| Circus | 14 | 9 | 1 | 24 | 189.5 |
| Dress | 15 | 8 | 1 | 24 | 189.5 |
| Funny | 14 | 6 | 4 | 24 | 189.5 |
| Gun | 18 | 6 | 0 | 24 | 189.5 |
| Holidays | 15 | 9 | 0 | 24 | 189.5 |
| Kitchen | 11 | 13 | 0 | 24 | 189.5 |
| Love | 15 | 9 | 0 | 24 | 189.5 |
| Mary | 14 | 9 | 1 | 24 | 189.5 |
| Mrs. | 13 | 9 | 2 | 24 | 189.5 |
| Newspaper | 14 | 9 | 1 | 24 | 189.5 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Nickel | 10 | 14 | 0 | 24 | 189.5 |
| Pete | 16 | 7 | 1 | 24 | 189.5 |
| Purple | 15 | 8 | 1 | 24 | 189.5 |
| Stick | 16 | 7 | 1 | 24 | 189.5 |
| Teeth | 15 | 8 | 1 | 24 | 189.5 |
| Toast | 17 | 7 | 0 | 24 | 189.5 |
| Tooth | 15 | 6 | 3 | 24 | 189.5 |
| Wagon | 14 | 10 | 0 | 24 | 189.5 |
| Wolf | 14 | 10 | 0 | 24 | 189.5 |
| Yesterday | 16 | 7 | 1 | 24 | 189.5 |
| Zoo | 10 | 13 | 1 | 24 | 189.5 |
| Be (Bee) | 17 | 6 | 0 | 23 | 219.0 |
| Bone | 12 | 10 | 1 | 23 | 219.0 |
| Box | 15 | 7 | 1 | 23 | 219.0 |
| Bug | 15 | 6 | 2 | 23 | 219.0 |
| Butter | 17 | 5 | 1 | 23 | 219.0 |
| Cheese | 17 | 6 | 0 | 23 | 219.0 |
| Cut | 14 | 8 | 1 | 23 | 219.0 |
| Dishes | 15 | 7 | 1 | 23 | 219.0 |
| Drum | 16 | 7 | 0 | 23 | 219.0 |
| Eraser | 9 | 12 | 2 | 23 | 219.0 |
| Family | 17 | 5 | 1 | 23 | 219.0 |
| Fight | 15 | 6 | 2 | 23 | 219.0 |
| Flowers | 13 | 9 | 1 | 23 | 219.0 |
| Hay | 14 | 7 | 2 | 23 | 219.0 |
| I (Eye) | 14 | 9 | 0 | 23 | 219.0 |
| Ice | 14 | 7 | 2 | 23 | 219.0 |
| Ink | 13 | 9 | 1 | 23 | 219.0 |
| Meat | 16 | 5 | 2 | 23 | 219.0 |
| Mice | 13 | 10 | 0 | 23 | 219.0 |
| Ocean | 14 | 8 | 1 | 23 | 219.0 |
| Pants | 15 | 7 | 1 | 23 | 219.0 |
| Paper | 17 | 6 | 0 | 23 | 219.0 |
| Pet | 15 | 8 | 0 | 23 | 219.0 |
| Pretty | 14 | 9 | 0 | 23 | 219.0 |
| Recess | 15 | 7 | 1 | 23 | 219.0 |
| Road (Rode) | 13 | 9 | 1 | 23 | 219.0 |
| Rock | 17 | 6 | 0 | 23 | 219.0 |
| Sleepy | 18 | 5 | 0 | 23 | 219.0 |
| Teach | 13 | 8 | 2 | 23 | 219.0 |
| Tomorrow | 18 | 5 | 0 | 23 | 219.0 |

| Word | Times Recalled at: UTEP | UWVH | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Toys | 14 | 9 | 0 | 23 | 219.0 |
| Trousers | 12 | 10 | 1 | 23 | 219.0 |
| Wash | 15 | 8 | 0 | 23 | 219.0 |
| Apples | 10 | 3 | 1 | 22 | 252.5 |
| Broke | 13 | 9 | 0 | 22 | 252.5 |
| Cap | 12 | 10 | 0 | 22 | 252.5 |
| Cardboard | 15 | 7 | 0 | 22 | 252.5 |
| Chalk | 12 | 10 | 0 | 22 | 252.5 |
| Church | 13 | 9 | 0 | 22 | 252.5 |
| Cry | 17 | 5 | 0 | 22 | 252.5 |
| Doll | 15 | 4 | 3 | 22 | 252.5 |
| Face | 11 | 9 | 2 | 22 | 252.5 |
| Forget | 15 | 5 | 2 | 22 | 252.5 |
| Hair | 14 | 8 | 0 | 22 | 252.5 |
| Invited | 11 | 10 | 1 | 22 | 252.5 |
| Joe | 12 | 9 | 1 | 22 | 252.5 |
| Karen | 16 | 6 | 0 | 22 | 252.5 |
| Knife | 16 | 6 | 0 | 22 | 252.5 |
| Lost | 15 | 7 | 0 | 22 | 252.5 |
| Moo | 13 | 8 | 1 | 22 | 252.5 |
| Mr. | 12 | 8 | 2 | 22 | 252.5 |
| Neat | 10 | 9 | 3 | 22 | 252.5 |
| Note | 17 | 4 | 1 | 22 | 252.5 |
| Paint | 14 | 6 | 2 | 22 | 252.5 |
| Presents | 14 | 8 | 0 | 22 | 252.5 |
| Roses | 16 | 6 | 0 | 22 | 252.5 |
| Sam | 15 | 7 | 0 | 22 | 252.5 |
| Sis | 11 | 10 | 1 | 22 | 252.5 |
| Snow | 12 | 8 | 2 | 22 | 252.5 |
| Squirrel | 16 | 6 | 0 | 22 | 252.5 |
| Stop | 17 | 4 | 1 | 22 | 252.5 |
| Sugar | 15 | 7 | 0 | 22 | 252.5 |
| Sun (Son) | 15 | 7 | 0 | 22 | 252.5 |
| Telephone | 13 | 8 | 1 | 22 | 252.5 |
| Vacation | 16 | 6 | 0 | 22 | 252.5 |
| War | 14 | 5 | 3 | 22 | 252.5 |
| Woman | 11 | 9 | 2 | 22 | 252.5 |
| Ball | 15 | 6 | 0 | 21 | 280.5 |
| Bird | 12 | 8 | 1 | 21 | 280.5 |
| Candles | 15 | 6 | 0 | 21 | 280.5 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Clock | 15 | 6 | 0 | 21 | 280.5 |
| Cloudy | 8 | 10 | 3 | 21 | 280.5 |
| Cookies | 9 | 11 | 1 | 21 | 280.5 |
| Cute | 13 | 6 | 2 | 21 | 280.5 |
| Dick | 14 | 5 | 2 | 21 | 280.5 |
| Eyes | 12 | 9 | 0 | 21 | 280.5 |
| Green | 12 | 8 | 1 | 21 | 280.5 |
| Hurt | 12 | 8 | 1 | 21 | 280.5 |
| Jelly | 12 | 8 | 1 | 21 | 280.5 |
| Listen | 14 | 6 | 1 | 21 | 280.5 |
| Old | 13 | 7 | 1 | 21 | 280.5 |
| Saturday | 12 | 9 | 0 | 21 | 280.5 |
| Ship | 9 | 12 | 0 | 21 | 280.5 |
| Sleigh | 15 | 5 | 1 | 21 | 280.5 |
| Street | 11 | 8 | 2 | 21 | 280.5 |
| Town | 14 | 5 | 2 | 21 | 280.5 |
| Turtle | 12 | 9 | 0 | 21 | 280.5 |
| Warm | 17 | 4 | 0 | 21 | 280.5 |
| Worms | 16 | 5 | 0 | 21 | 280.5 |
| Absent | 11 | 9 | 0 | 20 | 311.5 |
| Afraid | 13 | 4 | 3 | 20 | 311.5 |
| Bill | 10 | 8 | 2 | 20 | 311.5 |
| Blue | 11 | 8 | 1 | 20 | 311.5 |
| Book | 15 | 5 | 0 | 20 | 311.5 |
| Button | 11 | 9 | 0 | 20 | 311.5 |
| Cold | 10 | 8 | 2 | 20 | 311.5 |
| Country | 12 | 7 | 1 | 20 | 311.5 |
| Curls | 14 | 5 | 1 | 20 | 311.5 |
| Dave | 12 | 8 | 0 | 20 | 311.5 |
| Died | 13 | 6 | 1 | 20 | 311.5 |
| Dollars | 11 | 8 | 1 | 20 | 311.5 |
| Ears | 12 | 8 | 0 | 20 | 311.5 |
| Evening | 13 | 7 | 0 | 20 | 311.5 |
| Feet | 11 | 7 | 2 | 20 | 311.5 |
| Fireplace | 9 | 11 | 0 | 20 | 311.5 |
| Fly | 14 | 4 | 2 | 20 | 311.5 |
| Games | 15 | 4 | 1 | 20 | 311.5 |
| Garden | 12 | 7 | 1 | 20 | 311.5 |
| Home | 15 | 4 | 1 | 20 | 311.5 |
| Hundred | 12 | 6 | 2 | 20 | 311.5 |
| Kid | 12 | 8 | 0 | 20 | 311.5 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Legs | 12 | 6 | 2 | 20 | 311.5 |
| Money | 11 | 7 | 2 | 20 | 311.5 |
| Outdoors | 10 | 9 | 1 | 20 | 311.5 |
| Park | 12 | 7 | 1 | 20 | 311.5 |
| Pie | 17 | 3 | 0 | 20 | 311.5 |
| River | 15 | 5 | 0 | 20 | 311.5 |
| Rug | 14 | 5 | 1 | 20 | 311.5 |
| Scissors | 10 | 9 | 1 | 20 | 311.5 |
| Shirt | 12 | 7 | 1 | 20 | 311.5 |
| Shop | 9 | 9 | 2 | 20 | 311.5 |
| Soldiers | 13 | 6 | 1 | 20 | 311.5 |
| Sorry | 13 | 5 | 2 | 20 | 311.5 |
| Spot | 15 | 4 | 1 | 20 | 311.5 |
| Stove | 13 | 6 | 1 | 20 | 311.5 |
| Train | 11 | 9 | 0 | 20 | 311.5 |
| Wet | 13 | 6 | 1 | 20 | 311.5 |
| Window | 12 | 7 | 1 | 20 | 311.5 |
| Work | 15 | 5 | 0 | 20 | 311.5 |
| Animals | 13 | 6 | 0 | 19 | 362.0 |
| Artist | 10 | 9 | 0 | 19 | 362.0 |
| Aunt (Ant) | 9 | 6 | 4 | 19 | 362.0 |
| Bed | 13 | 5 | 1 | 19 | 362.0 |
| Bite | 12 | 7 | 0 | 19 | 362.0 |
| Breakfast | 11 | 8 | 0 | 19 | 362.0 |
| Bricks | 14 | 2 | 3 | 19 | 362.0 |
| Cage | 13 | 4 | 2 | 19 | 362.0 |
| Carrots | 11 | 8 | 0 | 19 | 362.0 |
| Climb | 15 | 3 | 1 | 19 | 362.0 |
| Clothes | 10 | 8 | 1 | 19 | 362.0 |
| Corner | 13 | 6 | 0 | 19 | 362.0 |
| Cousin | 12 | 6 | 1 | 19 | 362.0 |
| Cross | 12 | 7 | 0 | 19 | 362.0 |
| Cup | 10 | 8 | 1 | 19 | 362.0 |
| Dark | 13 | 6 | 0 | 19 | 362.0 |
| Dig | 12 | 5 | 2 | 19 | 362.0 |
| Door | 11 | 8 | 0 | 19 | 362.0 |
| Drop | 13 | 5 | 1 | 19 | 362.0 |
| Eggs | 12 | 6 | 1 | 19 | 362.0 |
| Fat | 8 | 9 | 2 | 19 | 362.0 |
| Flag | 11 | 8 | 0 | 19 | 362.0 |
| Float | 16 | 2 | 1 | 19 | 362.0 |
| Food | 13 | 6 | 0 | 19 | 362.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Frank | 11 | 6 | 2 | 19 | 362.0 |
| Friend | 12 | 4 | 3 | 19 | 362.0 |
| Garage | 13 | 5 | 1 | 19 | 362.0 |
| Glass | 8 | 11 | 0 | 19 | 362.0 |
| Gloves | 8 | 11 | 0 | 19 | 362.0 |
| Hang | 15 | 4 | 0 | 19 | 362.0 |
| Helen | 11 | 8 | 0 | 19 | 362.0 |
| Hit | 13 | 5 | 1 | 19 | 362.0 |
| Lettuce | 11 | 7 | 1 | 19 | 362.0 |
| Machine | 15 | 2 | 2 | 19 | 362.0 |
| Mud | 14 | 3 | 2 | 19 | 362.0 |
| Neck | 11 | 7 | 1 | 19 | 362.0 |
| Parade | 11 | 7 | 1 | 19 | 362.0 |
| Patty | 11 | 8 | 0 | 19 | 362.0 |
| Picture | 13 | 6 | 0 | 19 | 362.0 |
| Plane | 15 | 4 | 0 | 19 | 362.0 |
| Play | 9 | 10 | 0 | 19 | 362.0 |
| Please | 13 | 6 | 0 | 19 | 362.0 |
| Porch | 11 | 7 | 1 | 19 | 362.0 |
| Scared | 12 | 6 | 1 | 19 | 362.0 |
| Sheep | 14 | 4 | 1 | 19 | 362.0 |
| Sick | 13 | 6 | 0 | 19 | 362.0 |
| Star | 14 | 5 | 0 | 19 | 362.0 |
| Stoop | 13 | 5 | 1 | 19 | 362.0 |
| Stuck | 13 | 5 | 1 | 19 | 362.0 |
| Sweater | 12 | 7 | 0 | 19 | 362.0 |
| Tadpoles | 9 | 9 | 1 | 19 | 362.0 |
| Ten | 12 | 6 | 1 | 19 | 362.0 |
| Tickets | 11 | 7 | 1 | 19 | 362.0 |
| Tiger | 12 | 6 | 1 | 19 | 362.0 |
| Together | 10 | 8 | 1 | 19 | 362.0 |
| Tom | 11 | 7 | 1 | 19 | 362.0 |
| Touch | 13 | 5 | 1 | 19 | 362.0 |
| Truck | 9 | 9 | 1 | 19 | 362.0 |
| Whistle | 12 | 6 | 1 | 19 | 362.0 |
| Wish | 14 | 5 | 0 | 19 | 362.0 |
| World | 15 | 4 | 0 | 19 | 362.0 |
| Air | 14 | 4 | 0 | 18 | 420.0 |
| Arm | 10 | 8 | 0 | 18 | 420.0 |
| Bad | 13 | 4 | 1 | 18 | 420.0 |
| Band | 12 | 5 | 1 | 18 | 420.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Bank | 10 | 6 | 2 | 18 | 420.0 |
| Bat | 13 | 4 | 1 | 18 | 420.0 |
| Beads | 10 | 7 | 1 | 18 | 420.0 |
| Behind | 11 | 4 | 3 | 18 | 420.0 |
| Blow | 11 | 7 | 0 | 18 | 420.0 |
| Brush | 11 | 5 | 2 | 18 | 420.0 |
| Building | 12 | 6 | 0 | 18 | 420.0 |
| Cabbage | 9 | 9 | 0 | 18 | 420.0 |
| Clean | 15 | 3 | 0 | 18 | 420.0 |
| Come | 10 | 7 | 1 | 18 | 420.0 |
| Cool | 11 | 4 | 3 | 18 | 420.0 |
| Desk | 10 | 8 | 0 | 18 | 420.0 |
| Did | 11 | 7 | 0 | 18 | 420.0 |
| Don | 12 | 6 | 0 | 18 | 420.0 |
| Excuse | 12 | 3 | 3 | 18 | 420.0 |
| Five | 11 | 5 | 2 | 18 | 420.0 |
| Floor | 12 | 5 | 1 | 18 | 420.0 |
| For (Four) | 9 | 7 | 2 | 18 | 420.0 |
| Forgot | 13 | 4 | 1 | 18 | 420.0 |
| Friday | 13 | 4 | 1 | 18 | 420.0 |
| Fruit | 13 | 5 | 0 | 18 | 420.0 |
| Happy | 14 | 4 | 0 | 18 | 420.0 |
| Hat | 10 | 7 | 1 | 18 | 420.0 |
| Haven't | 15 | 3 | 0 | 18 | 420.0 |
| Heart | 11 | 7 | 0 | 18 | 420.0 |
| Himself | 12 | 5 | 1 | 18 | 420.0 |
| Hunt | 13 | 4 | 1 | 18 | 420.0 |
| Iron | 8 | 9 | 1 | 18 | 420.0 |
| Jack | 11 | 6 | 1 | 18 | 420.0 |
| Land | 12 | 5 | 1 | 18 | 420.0 |
| Lion | 11 | 7 | 0 | 18 | 420.0 |
| Many | 12 | 5 | 1 | 18 | 420.0 |
| Men | 12 | 5 | 1 | 18 | 420.0 |
| Morning | 12 | 5 | 1 | 18 | 420.0 |
| Outside | 12 | 5 | 1 | 18 | 420.0 |
| Overshoes | 6 | 9 | 3 | 18 | 420.0 |
| Paws | 11 | 6 | 1 | 18 | 420.0 |
| Pick | 11 | 6 | 1 | 18 | 420.0 |
| Pull | 9 | 9 | 0 | 18 | 420.0 |
| Ring | 10 | 7 | 1 | 18 | 420.0 |
| Robert | 10 | 7 | 1 | 18 | 420.0 |
| Ran | 13 | 5 | 0 | 18 | 420.0 |
| Shepherds | 13 | 5 | 0 | 18 | 420.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Sky | 13 | 5 | 0 | 18 | 420.0 |
| Sunshine | 13 | 3 | 2 | 18 | 420.0 |
| Tear | 11 | 7 | 0 | 18 | 420.0 |
| Test | 11 | 6 | 1 | 18 | 420.0 |
| Three | 11 | 5 | 2 | 18 | 420.0 |
| Walk | 11 | 6 | 1 | 18 | 420.0 |
| Wheels | 13 | 5 | 0 | 18 | 420.0 |
| Asleep | 8 | 7 | 2 | 17 | 469.0 |
| Big | 12 | 5 | 0 | 17 | 469.0 |
| Class | 14 | 3 | 0 | 17 | 469.0 |
| Clay | 11 | 5 | 1 | 17 | 469.0 |
| Cotton | 10 | 6 | 1 | 17 | 469.0 |
| Curly | 10 | 6 | 1 | 17 | 469.0 |
| Dan | 11 | 6 | 0 | 17 | 469.0 |
| Dinner | 10 | 6 | 1 | 17 | 469.0 |
| Don't | 13 | 2 | 2 | 17 | 469.0 |
| Drink | 12 | 4 | 1 | 17 | 469.0 |
| Drive | 7 | 8 | 2 | 17 | 469.0 |
| Everything | 8 | 7 | 2 | 17 | 469.0 |
| Foot | 11 | 6 | 0 | 17 | 469.0 |
| Fun | 12 | 4 | 1 | 17 | 469.0 |
| Goose | 10 | 6 | 1 | 17 | 469.0 |
| Hide | 14 | 3 | 0 | 17 | 469.0 |
| High (Hi) | 14 | 3 | 0 | 17 | 469.0 |
| His | 11 | 3 | 3 | 17 | 469.0 |
| Joyce | 9 | 8 | 0 | 17 | 469.0 |
| Mike | 11 | 6 | 0 | 17 | 469.0 |
| Myself | 10 | 4 | 3 | 17 | 469.0 |
| Nice | 14 | 2 | 1 | 17 | 469.0 |
| One (Won) | 10 | 6 | 1 | 17 | 469.0 |
| Remember | 9 | 8 | 0 | 17 | 469.0 |
| Robin | 8 | 8 | 1 | 17 | 469.0 |
| Roll | 14 | 3 | 0 | 17 | 469.0 |
| See (Sea) | 13 | 3 | 1 | 17 | 469.0 |
| She | 11 | 5 | 1 | 17 | 469.0 |
| Sleep | 9 | 7 | 1 | 17 | 469.0 |
| Sorrowfully | 12 | 3 | 2 | 17 | 469.0 |
| Station | 10 | 5 | 2 | 17 | 469.0 |
| Suit | 11 | 5 | 1 | 17 | 469.0 |
| Supper | 10 | 6 | 1 | 17 | 469.0 |
| Table | 9 | 8 | 0 | 17 | 469.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Talk | 15 | 1 | 1 | 17 | 469.0 |
| Trip | 13 | 3 | 1 | 17 | 469.0 |
| Vegetable | 8 | 9 | 0 | 17 | 469.0 |
| Watch | 8 | 9 | 0 | 17 | 469.0 |
| We | 11 | 6 | 0 | 17 | 469.0 |
| Weather | 10 | 5 | 2 | 17 | 469.0 |
| Wild | 11 | 4 | 2 | 17 | 469.0 |
| Wind | 12 | 4 | 1 | 17 | 469.0 |
| Yellow | 9 | 7 | 1 | 17 | 469.0 |
| An (Ann) | 9 | 4 | 3 | 16 | 517.5 |
| Anybody | 6 | 9 | 1 | 16 | 517.5 |
| Barn | 8 | 7 | 1 | 16 | 517.5 |
| Because | 12 | 2 | 2 | 16 | 517.5 |
| Bells | 7 | 7 | 2 | 16 | 517.5 |
| Bigger | 12 | 4 | 0 | 16 | 517.5 |
| Bottle | 10 | 6 | 0 | 16 | 517.5 |
| Break | 10 | 5 | 1 | 16 | 517.5 |
| Brown | 5 | 10 | 1 | 16 | 517.5 |
| Careful | 13 | 3 | 0 | 16 | 517.5 |
| Carry | 8 | 4 | 4 | 16 | 517.5 |
| Close | 12 | 4 | 0 | 16 | 517.5 |
| Corn | 11 | 4 | 1 | 16 | 517.5 |
| Dime | 9 | 6 | 1 | 16 | 517.5 |
| Dirt | 9 | 7 | 0 | 16 | 517.5 |
| Do | 9 | 4 | 3 | 16 | 517.5 |
| Electric | 5 | 10 | 1 | 16 | 517.5 |
| Flew | 9 | 7 | 0 | 16 | 517.5 |
| Hand | 8 | 8 | 0 | 16 | 517.5 |
| Here (Hear) | 11 | 2 | 3 | 16 | 517.5 |
| Horn | 12 | 3 | 1 | 16 | 517.5 |
| Isn't | 12 | 4 | 0 | 16 | 517.5 |
| Juice | 11 | 4 | 1 | 16 | 517.5 |
| Jump | 10 | 6 | 0 | 16 | 517.5 |
| Keen | 9 | 7 | 0 | 16 | 517.5 |
| Leave | 13 | 2 | 1 | 16 | 517.5 |
| Mouth | 10 | 6 | 0 | 16 | 517.5 |
| Nine | 9 | 7 | 0 | 16 | 517.5 |
| Oil | 7 | 7 | 2 | 16 | 517.5 |
| Pink | 9 | 6 | 1 | 16 | 517.5 |
| Poor | 9 | 7 | 0 | 16 | 517.5 |
| Read | 8 | 7 | 1 | 16 | 517.5 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Red | 8 | 7 | 1 | 16 | 517.5 |
| Room | 14 | 2 | 0 | 16 | 517.5 |
| Rubber | 8 | 7 | 1 | 16 | 517.5 |
| Sand | 12 | 4 | 0 | 16 | 517.5 |
| Seven | 10 | 3 | 3 | 16 | 517.5 |
| Show | 10 | 5 | 1 | 16 | 517.5 |
| Sit | 9 | 5 | 2 | 16 | 517.5 |
| Small | 10 | 5 | 1 | 16 | 517.5 |
| Soft | 12 | 4 | 0 | 16 | 517.5 |
| Story | 9 | 7 | 0 | 16 | 517.5 |
| Summer | 8 | 7 | 1 | 16 | 517.5 |
| Sweet | 9 | 5 | 2 | 16 | 517.5 |
| Thursday | 10 | 6 | 0 | 16 | 517.5 |
| Tie | 9 | 7 | 0 | 16 | 517.5 |
| Tiny | 12 | 4 | 0 | 16 | 517.5 |
| Toe (Tow) | 10 | 5 | 1 | 16 | 517.5 |
| Tree | 10 | 6 | 0 | 16 | 517.5 |
| Tricks | 11 | 4 | 1 | 16 | 517.5 |
| When | 10 | 5 | 1 | 16 | 517.5 |
| Which | 11 | 4 | 1 | 16 | 517.5 |
| Wonder | 10 | 4 | 2 | 16 | 517.5 |
| Would (Wood) | 7 | 8 | 1 | 16 | 517.5 |
| A | 11 | 4 | 0 | 15 | 564.0 |
| Al | 7 | 7 | 1 | 15 | 564.0 |
| Ask | 11 | 4 | 0 | 15 | 564.0 |
| Bark | 11 | 2 | 2 | 15 | 564.0 |
| Bowl | 7 | 7 | 1 | 15 | 564.0 |
| Bruce | 6 | 9 | 0 | 15 | 564.0 |
| Can | 9 | 6 | 0 | 15 | 564.0 |
| Cost | 9 | 5 | 1 | 15 | 564.0 |
| Gold | 7 | 8 | 0 | 15 | 564.0 |
| Got | 10 | 4 | 1 | 15 | 564.0 |
| Help | 9 | 6 | 0 | 15 | 564.0 |
| Hill | 10 | 5 | 0 | 15 | 564.0 |
| Hop | 10 | 4 | 1 | 15 | 564.0 |
| Jean | 10 | 4 | 1 | 15 | 564.0 |
| Joan | 7 | 7 | 1 | 15 | 564.0 |
| Laugh | 13 | 2 | 0 | 15 | 564.0 |
| Mad | 13 | 1 | 1 | 15 | 564.0 |
| Mean | 9 | 4 | 2 | 15 | 564.0 |
| Mew | 8 | 6 | 1 | 15 | 564.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Name | 11 | 4 | 0 | 15 | 564.0 |
| O'clock | 8 | 6 | 1 | 15 | 564.0 |
| Paste | 11 | 4 | 0 | 15 | 564.0 |
| Piece | 8 | 4 | 3 | 15 | 564.0 |
| Real | 13 | 2 | 0 | 15 | 564.0 |
| Riddles | 10 | 3 | 2 | 15 | 564.0 |
| Rope | 9 | 5 | 1 | 15 | 564.0 |
| Sad | 12 | 2 | 1 | 15 | 564.0 |
| Say | 12 | 3 | 0 | 15 | 564.0 |
| Seeds | 9 | 4 | 2 | 15 | 564.0 |
| Skip | 7 | 8 | 0 | 15 | 564.0 |
| Sled | 9 | 6 | 0 | 15 | 564.0 |
| Spring | 6 | 9 | 0 | 15 | 564.0 |
| Strong | 12 | 3 | 0 | 15 | 564.0 |
| Table | 8 | 6 | 1 | 15 | 564.0 |
| Tonight | 11 | 4 | 0 | 15 | 564.0 |
| Towel | 9 | 6 | 0 | 15 | 564.0 |
| Trunk | 8 | 7 | 0 | 15 | 564.0 |
| Try | 11 | 4 | 0 | 15 | 564.0 |
| Wore | 9 | 4 | 2 | 15 | 564.0 |
| Bag | 6 | 7 | 1 | 14 | 602.0 |
| Beat | 13 | 1 | 0 | 14 | 602.0 |
| Build | 12 | 2 | 0 | 14 | 602.0 |
| Call | 9 | 5 | 0 | 14 | 602.0 |
| Dear (Deer) | 8 | 6 | 0 | 14 | 602.0 |
| Dine | 7 | 7 | 0 | 14 | 602.0 |
| Down | 11 | 2 | 1 | 14 | 602.0 |
| Feed | 8 | 6 | 0 | 14 | 602.0 |
| Fur | 8 | 4 | 2 | 14 | 602.0 |
| Good | 10 | 3 | 1 | 14 | 602.0 |
| He | 7 | 5 | 2 | 14 | 602.0 |
| Lay | 8 | 6 | 0 | 14 | 602.0 |
| Lessons | 7 | 5 | 2 | 14 | 602.0 |
| Little | 7 | 7 | 0 | 14 | 602.0 |
| Live | 11 | 3 | 0 | 14 | 602.0 |
| Lunch | 8 | 6 | 0 | 14 | 602.0 |
| Man | 8 | 6 | 0 | 14 | 602.0 |
| Me | 8 | 6 | 0 | 14 | 602.0 |
| My | 8 | 6 | 0 | 14 | 602.0 |
| Our | 6 | 7 | 1 | 14 | 602.0 |
| Over | 9 | 5 | 0 | 14 | 602.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Pail | 12 | 2 | 0 | 14 | 602.0 |
| Pair (Pear) | 9 | 5 | 0 | 14 | 602.0 |
| Rain | 12 | 2 | 0 | 14 | 602.0 |
| Shine | 10 | 3 | 1 | 14 | 602.0 |
| Smell | 10 | 4 | 0 | 14 | 602.0 |
| Sometimes | 10 | 4 | 0 | 14 | 602.0 |
| Swing | 10 | 3 | 1 | 14 | 602.0 |
| The | 6 | 8 | 0 | 14 | 602.0 |
| Things | 12 | 2 | 0 | 14 | 602.0 |
| Thirsty | 6 | 6 | 2 | 14 | 602.0 |
| Thirty | 9 | 5 | 0 | 14 | 602.0 |
| Throw | 11 | 3 | 0 | 14 | 602.0 |
| Top | 9 | 4 | 1 | 14 | 602.0 |
| Up | 7 | 6 | 1 | 14 | 602.0 |
| We'll | 10 | 3 | 1 | 14 | 602.0 |
| Wear (Where) | 8 | 5 | 1 | 14 | 602.0 |
| Around | 5 | 6 | 2 | 13 | 645.0 |
| Away | 8 | 4 | 1 | 13 | 645.0 |
| Back | 9 | 4 | 0 | 13 | 645.0 |
| Began | 8 | 4 | 1 | 13 | 645.0 |
| Bet | 9 | 3 | 1 | 13 | 645.0 |
| Board | 8 | 4 | 1 | 13 | 645.0 |
| Bow | 8 | 5 | 0 | 13 | 645.0 |
| Cards | 7 | 4 | 2 | 13 | 645.0 |
| Catch | 11 | 1 | 1 | 13 | 645.0 |
| Copied | 11 | 2 | 0 | 13 | 645.0 |
| Eight | 9 | 4 | 0 | 13 | 645.0 |
| Fall | 9 | 3 | 1 | 13 | 645.0 |
| Fan | 8 | 4 | 1 | 13 | 645.0 |
| Fix | 8 | 5 | 0 | 13 | 645.0 |
| Glad | 10 | 3 | 0 | 13 | 645.0 |
| Good-by | 7 | 6 | 0 | 13 | 645.0 |
| Hard | 6 | 4 | 3 | 13 | 645.0 |
| Hardly | 8 | 5 | 0 | 13 | 645.0 |
| Head | 7 | 6 | 0 | 13 | 645.0 |
| Hole (Whole) | 4 | 7 | 2 | 13 | 645.0 |
| Hot | 7 | 6 | 0 | 13 | 645.0 |
| Inside | 10 | 3 | 0 | 13 | 645.0 |
| Leaf | 7 | 5 | 1 | 13 | 645.0 |
| Letter | 7 | 5 | 1 | 13 | 645.0 |
| Line | 10 | 2 | 1 | 13 | 645.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Mail (Male) | 5 | 7 | 1 | 13 | 645.0 |
| March | 8 | 5 | 0 | 13 | 645.0 |
| Move | 9 | 4 | 0 | 13 | 645.0 |
| Near | 11 | 2 | 0 | 13 | 645.0 |
| Oh | 7 | 5 | 1 | 13 | 645.0 |
| Pen | 9 | 3 | 1 | 13 | 645.0 |
| Print | 10 | 3 | 0 | 13 | 645.0 |
| Quite | 8 | 5 | 0 | 13 | 645.0 |
| Ray | 8 | 5 | 0 | 13 | 645.0 |
| Sang | 11 | 2 | 0 | 13 | 645.0 |
| Saw | 9 | 3 | 1 | 13 | 645.0 |
| Seat | 12 | 1 | 0 | 13 | 645.0 |
| Set | 8 | 5 | 0 | 13 | 645.0 |
| Sing | 10 | 3 | 0 | 13 | 645.0 |
| Start | 11 | 2 | 0 | 13 | 645.0 |
| Step | 13 | 0 | 0 | 13 | 645.0 |
| Store | 7 | 6 | 0 | 13 | 645.0 |
| Thank | 8 | 5 | 0 | 13 | 645.0 |
| Toad | 7 | 4 | 2 | 13 | 645.0 |
| Tore | 6 | 6 | 1 | 13 | 645.0 |
| Track | 9 | 3 | 1 | 13 | 645.0 |
| Turn | 10 | 2 | 1 | 13 | 645.0 |
| Under | 8 | 4 | 1 | 13 | 645.0 |
| Well | 11 | 1 | 1 | 13 | 645.0 |
| About | 10 | 2 | 0 | 12 | 695.5 |
| Along | 6 | 4 | 2 | 12 | 695.5 |
| Bread | 8 | 4 | 0 | 12 | 695.5 |
| Calf | 7 | 5 | 0 | 12 | 695.5 |
| Care | 6 | 2 | 4 | 12 | 695.5 |
| Comb | 7 | 5 | 0 | 12 | 695.5 |
| Doesn't | 9 | 3 | 0 | 12 | 695.5 |
| Draw | 6 | 6 | 0 | 12 | 695.5 |
| Everybody | 9 | 3 | 0 | 12 | 695.5 |
| Forest | 10 | 2 | 0 | 12 | 695.5 |
| Go | 7 | 4 | 1 | 12 | 695.5 |
| Gray | 6 | 5 | 1 | 12 | 695.5 |
| Great | 9 | 2 | 1 | 12 | 695.5 |
| Hello | 5 | 7 | 0 | 12 | 695.5 |
| Him | 10 | 2 | 0 | 12 | 695.5 |
| Hope | 7 | 4 | 1 | 12 | 695.5 |
| Hungry | 8 | 4 | 0 | 12 | 695.5 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Hurry | 7 | 5 | 0 | 12 | 695.5 |
| Ignorance | 10 | 1 | 1 | 12 | 695.5 |
| Kept | 7 | 5 | 0 | 12 | 695.5 |
| Key | 9 | 2 | 1 | 12 | 695.5 |
| Lake | 7 | 5 | 0 | 12 | 695.5 |
| Late | 9 | 3 | 0 | 12 | 695.5 |
| Long | 8 | 4 | 0 | 12 | 695.5 |
| Lovely | 6 | 6 | 0 | 12 | 695.5 |
| Made | 11 | 0 | 1 | 12 | 695.5 |
| Monday | 8 | 3 | 1 | 12 | 695.5 |
| Month | 8 | 3 | 1 | 12 | 695.5 |
| More | 11 | 1 | 0 | 12 | 695.5 |
| Next | 8 | 3 | 1 | 12 | 695.5 |
| Noise | 10 | 2 | 0 | 12 | 695.5 |
| Number | 7 | 4 | 1 | 12 | 695.5 |
| Only | 6 | 5 | 1 | 12 | 695.5 |
| Place | 11 | 1 | 0 | 12 | 695.5 |
| Prize | 6 | 6 | 0 | 12 | 695.5 |
| Ride | 7 | 4 | 1 | 12 | 695.5 |
| Sentences | 6 | 6 | 0 | 12 | 695.5 |
| Spade | 10 | 2 | 0 | 12 | 695.5 |
| Stay | 9 | 3 | 0 | 12 | 695.5 |
| String | 9 | 3 | 0 | 12 | 695.5 |
| Sure | 11 | 1 | 0 | 12 | 695.5 |
| Tail (Tale) | 8 | 4 | 0 | 12 | 695.5 |
| To (Too, Two) | 9 | 3 | 0 | 12 | 695.5 |
| Today | 10 | 2 | 0 | 12 | 695.5 |
| Twelve | 8 | 3 | 1 | 12 | 695.5 |
| Us | 11 | 1 | 0 | 12 | 695.5 |
| Very | 7 | 4 | 1 | 12 | 695.5 |
| Wake | 7 | 4 | 1 | 12 | 695.5 |
| Wednesday | 6 | 6 | 0 | 12 | 695.5 |
| West | 10 | 2 | 0 | 12 | 695.5 |
| White | 6 | 5 | 1 | 12 | 695.5 |
| You | 8 | 4 | 0 | 12 | 695.5 |
| Am | 8 | 2 | 1 | 11 | 768.5 |
| Anything | 5 | 3 | 3 | 11 | 768.5 |
| Anyway | 6 | 4 | 1 | 11 | 768.5 |
| Believe | 6 | 5 | 0 | 11 | 768.5 |
| Bit | 4 | 6 | 1 | 11 | 768.5 |
| Bright | 8 | 2 | 1 | 11 | 768.5 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Bring | 9 | 2 | 0 | 11 | 748.5 |
| Brought | 7 | 4 | 0 | 11 | 748.5 |
| Color | 7 | 3 | 1 | 11 | 748.5 |
| Dry | 9 | 2 | 0 | 11 | 748.5 |
| Fair | 8 | 2 | 0 | 11 | 748.5 |
| Fast | 8 | 2 | 1 | 11 | 748.5 |
| Feel | 5 | 6 | 0 | 11 | 748.5 |
| Fifteen | 8 | 2 | 1 | 11 | 748.5 |
| Finally | 5 | 6 | 0 | 11 | 748.5 |
| Finish | 5 | 5 | 1 | 11 | 748.5 |
| Full | 6 | 4 | 1 | 11 | 748.5 |
| Get | 6 | 3 | 2 | 11 | 748.5 |
| Grow | 9 | 2 | 0 | 11 | 748.5 |
| He's | 7 | 4 | 1 | 11 | 748.5 |
| Hen | 4 | 6 | 1 | 11 | 748.5 |
| Her | 8 | 3 | 0 | 11 | 748.5 |
| Hid | 4 | 6 | 1 | 11 | 748.5 |
| Hold | 7 | 3 | 1 | 11 | 748.5 |
| How | 5 | 6 | 0 | 11 | 748.5 |
| Idea | 7 | 3 | 1 | 11 | 748.5 |
| Knew (New) | 10 | 0 | 1 | 11 | 748.5 |
| Knocked | 6 | 5 | 0 | 11 | 748.5 |
| Look | 10 | 1 | 0 | 11 | 748.5 |
| May | 8 | 2 | 1 | 11 | 748.5 |
| Middle | 8 | 2 | 1 | 11 | 748.5 |
| Might | 6 | 5 | 0 | 11 | 748.5 |
| Mind | 9 | 2 | 0 | 11 | 748.5 |
| Minute | 11 | 0 | 0 | 11 | 748.5 |
| Music | 6 | 5 | 0 | 11 | 748.5 |
| Off | 8 | 2 | 1 | 11 | 748.5 |
| Once | 9 | 2 | 0 | 11 | 748.5 |
| Pay | 7 | 3 | 1 | 11 | 748.5 |
| Send | 10 | 1 | 0 | 11 | 748.5 |
| Shall | 8 | 1 | 2 | 11 | 748.5 |
| Short | 9 | 2 | 0 | 11 | 748.5 |
| Slide | 7 | 3 | 1 | 11 | 748.5 |
| Someone | 9 | 2 | 0 | 11 | 748.5 |
| Stand | 6 | 5 | 0 | 11 | 748.5 |
| Supposed | 6 | 4 | 1 | 11 | 748.5 |
| Tell | 7 | 4 | 0 | 11 | 748.5 |
| Those | 9 | 2 | 0 | 11 | 748.5 |
| Tired | 8 | 3 | 0 | 11 | 748.5 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Until | 9 | 2 | 0 | 11 | 748.5 |
| Upon | 5 | 6 | 0 | 11 | 748.5 |
| Will | 7 | 3 | 1 | 11 | 748.5 |
| Without | 8 | 3 | 0 | 11 | 748.5 |
| Won't | 6 | 3 | 2 | 11 | 748.5 |
| Yours | 6 | 4 | 1 | 11 | 748.5 |
| Across | 5 | 4 | 1 | 10 | 803.0 |
| Afternoon | 6 | 2 | 2 | 10 | 803.0 |
| All | 5 | 5 | 0 | 10 | 803.0 |
| And | 8 | 2 | 0 | 10 | 803.0 |
| Answer | 5 | 5 | 0 | 10 | 803.0 |
| Are | 7 | 2 | 1 | 10 | 803.0 |
| Awful | 5 | 5 | 0 | 10 | 803.0 |
| Best | 9 | 1 | 0 | 10 | 803.0 |
| Built | 7 | 3 | 0 | 10 | 803.0 |
| By (Buy) | 5 | 5 | 0 | 10 | 803.0 |
| Caught | 7 | 3 | 0 | 10 | 803.0 |
| Change | 5 | 5 | 0 | 10 | 803.0 |
| Clear | 8 | 2 | 0 | 10 | 803.0 |
| Couldn't | 6 | 3 | 1 | 10 | 803.0 |
| Does | 9 | 1 | 0 | 10 | 803.0 |
| Dreamed | 9 | 1 | 0 | 10 | 803.0 |
| Early | 6 | 4 | 0 | 10 | 803.0 |
| Else | 5 | 4 | 1 | 10 | 803.0 |
| Even | 7 | 3 | 0 | 10 | 803.0 |
| Fence | 7 | 3 | 0 | 10 | 803.0 |
| First | 4 | 5 | 1 | 10 | 803.0 |
| Guess | 8 | 2 | 0 | 10 | 803.0 |
| I'm | 8 | 2 | 0 | 10 | 803.0 |
| If | 10 | 0 | 0 | 10 | 803.0 |
| In | 7 | 3 | 0 | 10 | 803.0 |
| Into | 5 | 5 | 0 | 10 | 803.0 |
| It's | 6 | 4 | 0 | 10 | 803.0 |
| Keep | 5 | 5 | 0 | 10 | 803.0 |
| Kind | 9 | 0 | 1 | 10 | 803.0 |
| Know (No) | 7 | 3 | 0 | 10 | 803.0 |
| Let's | 5 | 4 | 1 | 10 | 803.0 |
| Loose | 8 | 1 | 1 | 10 | 803.0 |
| Maybe | 8 | 2 | 0 | 10 | 803.0 |
| Miss | 7 | 3 | 0 | 10 | 803.0 |
| Most | 9 | 0 | 1 | 10 | 803.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Not | 8 | 2 | 0 | 10 | 803.0 |
| Or | 7 | 2 | 1 | 10 | 803.0 |
| Ought | 5 | 5 | 0 | 10 | 803.0 |
| Plant | 9 | 1 | 0 | 10 | 803.0 |
| Program | 5 | 5 | 0 | 10 | 803.0 |
| Put | 4 | 5 | 1 | 10 | 803.0 |
| Rest | 8 | 2 | 0 | 10 | 803.0 |
| Secret | 7 | 3 | 0 | 10 | 803.0 |
| Such | 8 | 2 | 0 | 10 | 803.0 |
| Tardy | 4 | 5 | 1 | 10 | 803.0 |
| Thankful | 7 | 3 | 0 | 10 | 803.0 |
| That | 9 | 1 | 0 | 10 | 803.0 |
| Tight | 8 | 2 | 0 | 10 | 803.0 |
| Time | 5 | 5 | 0 | 10 | 803.0 |
| Told | 6 | 4 | 0 | 10 | 803.0 |
| Week (Weak) | 7 | 3 | 0 | 10 | 803.0 |
| Winter | 7 | 3 | 0 | 10 | 803.0 |
| Wouldn't | 8 | 2 | 0 | 10 | 803.0 |
| Years | 8 | 2 | 0 | 10 | 803.0 |
| You'll | 5 | 4 | 1 | 10 | 803.0 |
| Act | 5 | 3 | 1 | 9 | 855.0 |
| Again | 6 | 2 | 1 | 9 | 855.0 |
| Almost | 9 | 0 | 0 | 9 | 855.0 |
| Always | 6 | 3 | 0 | 9 | 855.0 |
| Both | 7 | 2 | 0 | 9 | 855.0 |
| Can't | 6 | 3 | 0 | 9 | 855.0 |
| Could | 8 | 0 | 1 | 9 | 855.0 |
| Done | 8 | 0 | 1 | 9 | 855.0 |
| Ed | 5 | 4 | 0 | 9 | 855.0 |
| Far | 3 | 6 | 0 | 9 | 855.0 |
| Fell | 7 | 2 | 0 | 9 | 855.0 |
| Field | 6 | 1 | 2 | 9 | 855.0 |
| Goodness | 5 | 2 | 2 | 9 | 855.0 |
| Grade | 6 | 2 | 1 | 9 | 855.0 |
| Ground | 6 | 2 | 1 | 9 | 855.0 |
| Just | 7 | 2 | 0 | 9 | 855.0 |
| Night | 6 | 3 | 0 | 9 | 855.0 |
| On | 5 | 4 | 0 | 9 | 855.0 |
| Open | 7 | 1 | 1 | 9 | 855.0 |
| Other | 6 | 1 | 0 | 9 | 855.0 |
| Own | 6 | 2 | 1 | 9 | 855.0 |
| Page | 5 | 4 | 0 | 9 | 855.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Pass | 4 | 3 | 2 | 9 | 855.0 |
| Quiet | 6 | 2 | 1 | 9 | 855.0 |
| Ready | 6 | 2 | 1 | 9 | 855.0 |
| Really | 8 | 1 | 0 | 9 | 855.0 |
| Round | 5 | 3 | 1 | 9 | 855.0 |
| Sail | 5 | 4 | 0 | 9 | 855.0 |
| Same | 8 | 1 | 0 | 9 | 855.0 |
| Sat | 7 | 2 | 0 | 9 | 855.0 |
| Says | 8 | 0 | 1 | 9 | 855.0 |
| Sent (Cent) | 6 | 2 | 1 | 9 | 855.0 |
| Shut | 6 | 3 | 0 | 9 | 855.0 |
| So (Sew) | 5 | 4 | 0 | 9 | 855.0 |
| Sold | 5 | 4 | 0 | 9 | 855.0 |
| Song | 7 | 2 | 0 | 9 | 855.0 |
| Spell | 5 | 2 | 2 | 9 | 855.0 |
| Taught | 8 | 1 | 0 | 9 | 855.0 |
| Think | 6 | 3 | 0 | 9 | 855.0 |
| Third | 7 | 2 | 0 | 9 | 855.0 |
| Till | 4 | 5 | 0 | 9 | 855.0 |
| Took | 6 | 3 | 0 | 9 | 855.0 |
| Use | 6 | 2 | 1 | 9 | 855.0 |
| Visit | 9 | 0 | 0 | 9 | 855.0 |
| Who | 5 | 3 | 1 | 9 | 855.0 |
| Written | 8 | 1 | 0 | 9 | 855.0 |
| Wrote | 7 | 2 | 0 | 9 | 855.0 |
| Yard | 5 | 4 | 0 | 9 | 855.0 |
| Yes | 7 | 2 | 0 | 9 | 855.0 |
| Also | 4 | 4 | 0 | 8 | 899.0 |
| Another | 6 | 1 | 1 | 8 | 899.0 |
| At | 6 | 1 | 1 | 8 | 899.0 |
| Been | 4 | 2 | 2 | 8 | 899.0 |
| Better | 7 | 1 | 0 | 8 | 899.0 |
| Bought | 4 | 3 | 1 | 8 | 899.0 |
| Came | 7 | 1 | 0 | 8 | 899.0 |
| Different | 5 | 3 | 0 | 8 | 899.0 |
| Enough | 6 | 2 | 0 | 8 | 899.0 |
| Few | 4 | 4 | 0 | 8 | 899.0 |
| Find | 6 | 2 | 0 | 8 | 899.0 |
| Front | 4 | 3 | 1 | 8 | 899.0 |
| Gone | 5 | 2 | 1 | 8 | 899.0 |
| Hall | 5 | 3 | 0 | 8 | 899.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Hasn't | 7 | 1 | 0 | 8 | 899.0 |
| I'd | 6 | 2 | 0 | 8 | 899.0 |
| It | 6 | 2 | 0 | 8 | 899.0 |
| Last | 7 | 1 | 0 | 8 | 899.0 |
| Let | 4 | 4 | 0 | 8 | 899.0 |
| Light | 5 | 3 | 0 | 8 | 899.0 |
| Lots | 7 | 1 | 0 | 8 | 899.0 |
| Loud | 6 | 2 | 0 | 8 | 899.0 |
| Mine | 5 | 3 | 0 | 8 | 899.0 |
| Must | 4 | 4 | 0 | 8 | 899.0 |
| Now | 7 | 1 | 0 | 8 | 899.0 |
| Part | 4 | 4 | 0 | 8 | 899.0 |
| Slid | 4 | 4 | 0 | 8 | 899.0 |
| Spin | 5 | 3 | 0 | 8 | 899.0 |
| Still | 6 | 2 | 0 | 8 | 899.0 |
| Study | 4 | 4 | 0 | 8 | 899.0 |
| Take | 4 | 4 | 0 | 8 | 899.0 |
| Than | 4 | 3 | 1 | 8 | 899.0 |
| This | 3 | 3 | 2 | 8 | 899.0 |
| Wait (Weight) | 4 | 4 | 0 | 8 | 899.0 |
| Wall | 3 | 5 | 0 | 8 | 899.0 |
| Way (Weigh) | 8 | 0 | 0 | 8 | 899.0 |
| Why | 5 | 3 | 0 | 8 | 899.0 |
| Woke | 5 | 3 | 0 | 8 | 899.0 |
| Your | 7 | 1 | 0 | 8 | 899.0 |
| After | 7 | 0 | 0 | 7 | 933.0 |
| Already | 3 | 3 | 1 | 7 | 933.0 |
| As | 4 | 2 | 1 | 7 | 933.0 |
| Day | 3 | 4 | 0 | 7 | 933.0 |
| Each | 7 | 0 | 0 | 7 | 933.0 |
| Either | 4 | 3 | 0 | 7 | 933.0 |
| Ever | 4 | 3 | 0 | 7 | 933.0 |
| Give | 4 | 1 | 2 | 7 | 933.0 |
| Has | 5 | 2 | 0 | 7 | 933.0 |
| Here's | 6 | 1 | 0 | 7 | 933.0 |
| I'll | 5 | 1 | 1 | 7 | 933.0 |
| I've | 5 | 2 | 0 | 7 | 933.0 |
| Is | 6 | 1 | 0 | 7 | 933.0 |
| Make | 4 | 3 | 0 | 7 | 933.0 |
| Met | 5 | 1 | 1 | 7 | 933.0 |
| Nearly | 4 | 3 | 0 | 7 | 933.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| **Need** | 5 | 2 | 0 | 7 | 933.0 |
| **Out** | 4 | 3 | 0 | 7 | 933.0 |
| **Paid** | 4 | 3 | 0 | 7 | 933.0 |
| **Pond** | 3 | 3 | 1 | 7 | 933.0 |
| **Sell** | 5 | 2 | 0 | 7 | 933.0 |
| **Side** | 4 | 3 | 0 | 7 | 933.0 |
| **Something** | 4 | 3 | 0 | 7 | 933.0 |
| **Soon** | 6 | 1 | 0 | 7 | 933.0 |
| **Straight** | 4 | 3 | 0 | 7 | 933.0 |
| **Their (There)** | 4 | 1 | 2 | 7 | 933.0 |
| **Thought** | 3 | 4 | 0 | 7 | 933.0 |
| **We're** | 3 | 4 | 0 | 7 | 933.0 |
| **With** | 3 | 3 | 1 | 7 | 933.0 |
| **Cents** | 4 | 2 | 0 | 6 | 958.5 |
| **Count** | 4 | 2 | 0 | 6 | 958.5 |
| **Dole** | 3 | 2 | 1 | 6 | 958.5 |
| **Every** | 4 | 1 | 1 | 6 | 958.5 |
| **Fine** | 5 | 1 | 0 | 6 | 958.5 |
| **From** | 4 | 2 | 0 | 6 | 958.5 |
| **Had** | 4 | 1 | 1 | 6 | 958.5 |
| **Half** | 3 | 3 | 0 | 6 | 958.5 |
| **Left** | 3 | 3 | 0 | 6 | 958.5 |
| **Like** | 4 | 2 | 0 | 6 | 958.5 |
| **Never** | 4 | 2 | 0 | 6 | 958.5 |
| **Nothing** | 6 | 0 | 0 | 6 | 958.5 |
| **Quit** | 1 | 3 | 2 | 6 | 958.5 |
| **Right** | 5 | 1 | 0 | 6 | 958.5 |
| **Some (Sum)** | 5 | 1 | 0 | 6 | 958.5 |
| **Then** | 5 | 1 | 0 | 6 | 958.5 |
| **These** | 4 | 1 | 1 | 6 | 958.5 |
| **What's** | 4 | 2 | 0 | 6 | 958.5 |
| **Where (Wear)** | 5 | 1 | 0 | 6 | 958.5 |
| **While** | 5 | 1 | 0 | 6 | 958.5 |
| **Whose** | 2 | 4 | 0 | 6 | 958.5 |
| **Write** | 6 | 0 | 0 | 6 | 958.5 |
| **Aren't** | 3 | 2 | 0 | 5 | 978.0 |
| **Didn't** | 2 | 3 | 0 | 5 | 978.0 |
| **End** | 2 | 3 | 0 | 5 | 978.0 |
| **Found** | 3 | 0 | 2 | 5 | 978.0 |
| **Gave** | 3 | 2 | 0 | 5 | 978.0 |

| Word | Times Recalled at: UTEP | UWVIR | CLEMSON | Total Times Recalled | Rank |
|---|---|---|---|---|---|
| Have | 2 | 3 | 0 | 5 | 978.0 |
| Heard (Herd) | 3 | 2 | 0 | 5 | 978.0 |
| Learn | 5 | 0 | 0 | 5 | 978.0 |
| Ran | 3 | 1 | 1 | 5 | 978.0 |
| Tall | 4 | 1 | 0 | 5 | 978.0 |
| Them | 3 | 2 | 0 | 5 | 978.0 |
| They | 5 | 0 | 0 | 5 | 978.0 |
| Though | 4 | 0 | 1 | 5 | 978.0 |
| Want | 5 | 0 | 0 | 5 | 978.0 |
| Was | 4 | 1 | 0 | 5 | 978.0 |
| Wasn't | 5 | 0 | 0 | 5 | 978.0 |
| Were | 5 | 0 | 0 | 5 | 978.0 |
| Any | 3 | 0 | 1 | 4 | 990.5 |
| Before | 3 | 1 | 0 | 4 | 990.5 |
| Much | 4 | 0 | 0 | 4 | 990.5 |
| Said | 4 | 0 | 0 | 4 | 990.5 |
| There's (Their's) | 4 | 0 | 0 | 4 | 990.5 |
| Threw (Through) | 2 | 2 | 0 | 4 | 990.5 |
| What | 4 | 0 | 0 | 4 | 990.5 |
| Words | 4 | 0 | 0 | 4 | 990.5 |
| Add | 2 | 1 | 0 | 3 | 995.5 |
| Of | 2 | 1 | 0 | 3 | 995.5 |
| Second | 0 | 2 | 0 | 2 | 998.0 |
| That's | 2 | 0 | 0 | 2 | 998.0 |
| Yet | 2 | 0 | 0 | 2 | 998.0 |
| Should | 1 | 0 | 0 | 1 | 1000.0 |

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